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BLUE JAY

Volume 62 Number 3 September 2004

Blue Jay, founded in 1942 by Isabel M. Priestly, is a journal of natural history and conservation for Saskatchewan and adjacent regions. It is published quarterly by **Nature Saskatchewan, 206-1860 Lorne Street, Regina, Saskatchewan S4P 2L7.**

CN ISSN 0006-5099

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COVERS: **Lesser Snow Geese near Naicam, SK on October 12th, 2003. Among the geese was one banded at Cape Henrietta Maria on James Bay in summer 2002. Photo by Carol Blenkin**

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PIRACY AND PROBABLE ATTEMPTED PIRACY BY COMMON RAVENS ON TURKEY VULTURES

WILLIAM J. WALLEY, 222 Bossons Ave., Dauphin, MB, R7N 0R2

J.K. Terres defines kleptoparasitism or piracy as the forceful taking of food by one species of bird from another.[3] In their recent treatise on the life history of the Turkey Vulture, Kirk and Mossman make reference only to Golden and Bald Eagles practicing kleptoparasitism on Turkey Vultures.[2] However, A.C. Bent reports the observations of a "very trustworthy mountaineer," given to Rev. J.J. Murray, who in turn told Bent of Common Ravens "worrying" Turkey Vultures until the vultures regurgitated their food, which was then consumed by the ravens.[1] In western Manitoba, there have been two observations of such raven-vulture interactions: one instance of piracy and another of probable attempted piracy.

In the summer of 2003, Hugh and Leinita Woods observed piracy by Common Ravens on Turkey Vultures (H. Woods, pers. comm.). The observation was made in Duck Mountain Provincial Park in west central Manitoba. The Woods watched in amazement as a flock of ravens induced the

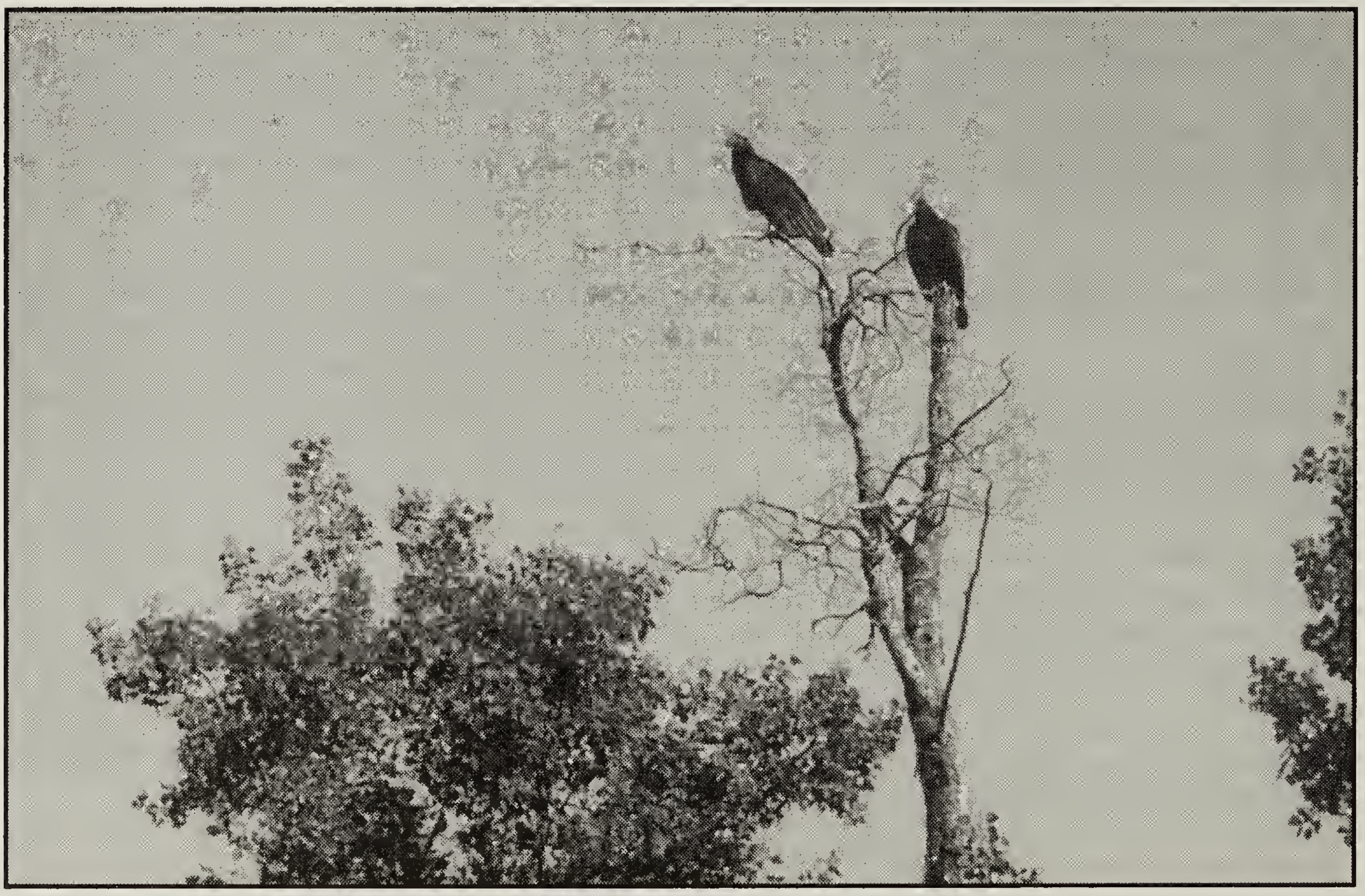

Figure 1. Two of the Turkey Vultures observed interacting with ravens on 12 July 2002. *William J. Walley.*

vultures to drop food to the ground which was subsequently consumed by the ravens.

I observed probable attempted food piracy in 2002. Mid-morning, 12 July, 2002, was windless with a blazing hot sun one km E of the E crest of the Shell Valley in Hillsburgh Municipality, some 15 km NE of the town of Roblin. The region lies in semi-arid deeply rolling prairie dominated by sparse growth of short grasses on uplands and slopes with small but dense stands of aspen poplar (*Populus tremuloides*) in low areas. Around 0920h, two Turkey Vultures were perched in dead branches in the crown of a stunted aspen with two ravens perched just below them. As the writer approached by vehicle, the ravens flew off, but the vultures remained long enough for a photograph (Fig.1). Near 1100h, the movements and interactions of the ravens and vultures were observed for approximately 25 minutes from a distance of 200 m using a 20 X spotting scope. Early in this time period, six Turkey Vultures arrived at the stunted aspens in ones or twos, with most small groups being followed by either one or two ravens for a total of four. Each raven perched 1.0 to 1.5 m below one or more of the vultures. In the building heat, all the ravens gaped, while one vulture extended its wings.

In one of the three trees occupied by the two species, a raven unhurriedly sidled upwards toward a vulture above it and extended its head toward the vulture's bill. The vulture held its perch, and, with a half-hearted thrust with its head, struck at the raven but did not make contact with it. A second raven similarly approached another vulture in another tree. In response to this advance, the vulture climbed higher, away from the raven. The raven did not continue its pursuit. Shortly thereafter, two ravens flew off and a seventh and an eighth vulture arrived. During the time the vultures and ravens occupied the trees together, and most notably just after the two ravens climbed toward the vultures, many of the birds looked downward toward the ground with great attentiveness. Eventually, the vultures flew off and spiraled upward on a thermal and the ravens dispersed.

It seems reasonable to assume that the motive for the ravens' interest in the vultures was food. How common the practice of food piracy by ravens on vultures is, and how it might have developed over time, is intriguing to speculate upon. Was it initiated at carcasses being fed upon by both scavengers? Were the vultures co-operatively feeding; that is, were a few vultures that had found food disgorging it to share with other vultures only to have the ravens intercept it, then subsequently pursue the vultures when they saw them aggregating elsewhere? Additional reports of this behaviour would enlighten naturalists as to the frequency of the practice reported years before to Rev. Murray by the "very trustworthy mountaineer."

Acknowledgements

Appreciation is extended to Hugh and Leinita Woods for the Duck Mountain observation of the raven - vulture interaction and to the editors for constructive remarks on the original manuscript.

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ROLES OF THREE FERRUGINOUS HAWKS AT THE SAME NEST SITE

MARTIN BAILEY and CAROL BJORKLUND, 102 - 1833 Coteau Avenue, Weyburn, SK. E-mail: <cmbb@sasktel.net>

The authors observed Ferruginous Hawks at a nest site in a pasture southwest of Weyburn, for 26 hours: from 6:00 a.m. to 6:00 p.m. each day on 23 and 24 May and from 11:00 a.m. to 1:00 p.m. on May 26, 2004. We returned for a final check on June 3rd.

May 23rd started as a dreary day. The sky was overcast, with Beaufort four winds (20-29 kph) coming out of the east, temperature 4C and intermittent drizzle. At 6:00 a.m., a Ferruginous Hawk was sitting on a nest in a tree in a poplar coppice. Soon after, another adult Ferruginous Hawk was seen preening itself on a fence post a half mile to the west of the nest. We spent the next two and a quarter hours following this hawk as it flew from one location within sight of the nest to other locations. Because of size differences and behaviour, it was evident that the larger bird on the nest was the female and the bird flapping from here to there was the male of the pair.[1] The female on the nest was in high breeding plumage, a huge, brightly coloured bird. The smaller male was less brightly plumed, perhaps due to fading in the sun.

At 8:15 a.m. the winds picked up, gusting to Beaufort five (30-38 kph) with yet more rain. A third Ferruginous Hawk, larger than the male but smaller than the female, was then noticed on a dirt pile within an eighth of a mile of us. It was pale-headed with a lightly streaked back and adult markings on the tail, and when it decided to fly north past the nest site, we noted that its leggings were white - a characteristic of an immature Ferruginous Hawk and not the rust red of the mature bird.[4] Each of the three birds was easily distinguished by its distinctive plumage and by size comparison.

The immature landed on a rock pile where it was soon joined by the adult male. There they were sheltered from the rain and the wind. The female remained on the nest. The two birds on the rock pile stayed together from 8:30 to 9:20 a.m., when one of the two flew low to the east and disappeared over the horizon. When we looked back to the rock pile, the other Ferruginous Hawk had also disappeared.

Half an hour later the adult male was seen eating prey on a fence post a mile southwest of the rock pile. The cloud cover had lifted and the sun was making an appearance. The adult male ate its prey in its entirety, then lifted up from the fence post and flew away. It soared and even hovered a mile northwest of the nest. At 11:10 a.m., the male was joined by the immature. They circled about each other once and then broke apart. The adult male flew immediately toward the nest area, presumably carrying prey passed to it in the air by the immature bird. The male was met by the female, who left the nest and flew to meet him on the ground at a point north of the nest site. Within a minute the female was back at the nest; she dropped the prey into the nest and stood on the edge of the nest for about four minutes before settling down onto the nest itself. Presumably, she allowed her chicks to eat the prey by themselves, suggesting that they were large enough to do so, although we did not see them. Then the female settled again over the chicks to protect them from rain and wind.

Food was brought to the nest only one more time on 23 May. The female left the nest at 1:23 p.m. and returned by 1:25 p.m. She landed on the ground near the nest copse and quickly brought up an item of prey. It was a Richardson's Ground Squirrel-sized mammal, which she dropped into the nest. She waited on the edge for five minutes before sitting back down. In neither this nor the previous case did she tear up the prey and feed it to the chicks; she merely stood on the edge of the nest and then sat down again.

Both flight hunting and perch hunting, the perch sometimes being the nest site itself, were observed on 23 May. These are the two most common hunting methods of the Ferruginous Hawk.[3]

On May 24 the weather had not improved – a steady rain all day. The ceiling was under 500 feet with northwest winds at Beaufort five, and a temperature of 7C. It was hard to see the female on the nest and neither the adult male nor the immature bird was spotted. Twelve hours later, neither the male nor the immature bird had come to the vicinity of the nest site, the female had not eaten all day nor had the chicks been fed. The female had not left the nest for twelve hours, nor even shifted her position on the nest. As we drove away at 6:20 p.m., we saw a Ferruginous Hawk along the road one half mile east of the nest site. It quickly flew south and disappeared.

Returning on 26 May, we saw the immature bird perched on the dirt pile between the nest site and our vehicle. When approached on foot, after an hour and a half of observation from the vehicle, the immature bird flew silently past the nest and over the horizon. The nest appeared empty. In the evening of 3 June, we returned to the site with Kelly Kozij who climbed up to inspect the large, sturdy stick nest lined with cow manure. One hawk feather was found and nothing else. There was no evidence in the nest or on the ground beneath of remains of young, eggshells or prey. No adults were observed in the vicinity of the nest nor at other alternate Ferruginous Hawk nest sites within three miles.

While Ferruginous Hawk nesting pairs are assumed to be monogamous, sometimes three adults are seen at the same nest, with the possibility of one being a helper (C.S. Houston, pers. comm.).[2] In this case, there was no competition between the two hawks on the rock pile, and given that there is no evidence that immature Ferruginous Hawks breed, this was not surprising.[3] As part of the strategy to raise nestlings, helpers have been described amongst a number of bird species. Helpers may be of almost any age, they may be breeding or non-breeding individuals, and they may carry out a variety of activities from feeding the young, to nest defense and attacking enemies venturing too close to community nests.[5] Three adult birds have been seen on occasion at Ferruginous Hawk nest sites, but no one has speculated on the possible helper role of the third bird (C.S. Houston, pers. comm.).[2] While it was beyond the capabilities of our telescope to determine whether or not the immature bird handed off prey to the adult male high in the sky, we think it likely. Certainly the adult male flew purposefully in a manner similar to other birds of prey carrying food, and he flew to a spot closer to the nest where he dropped the prey on the ground. It was then retrieved by the female - a typical behaviour pattern that occurs between male and female Ferruginous Hawks.

In conclusion, while it cannot be determined with absolute certainty that the role of the third Ferruginous Hawk at this nest site was to help in food gathering for the nestlings, from what was observed on May 23, 2004, it is nevertheless a distinct possibility.

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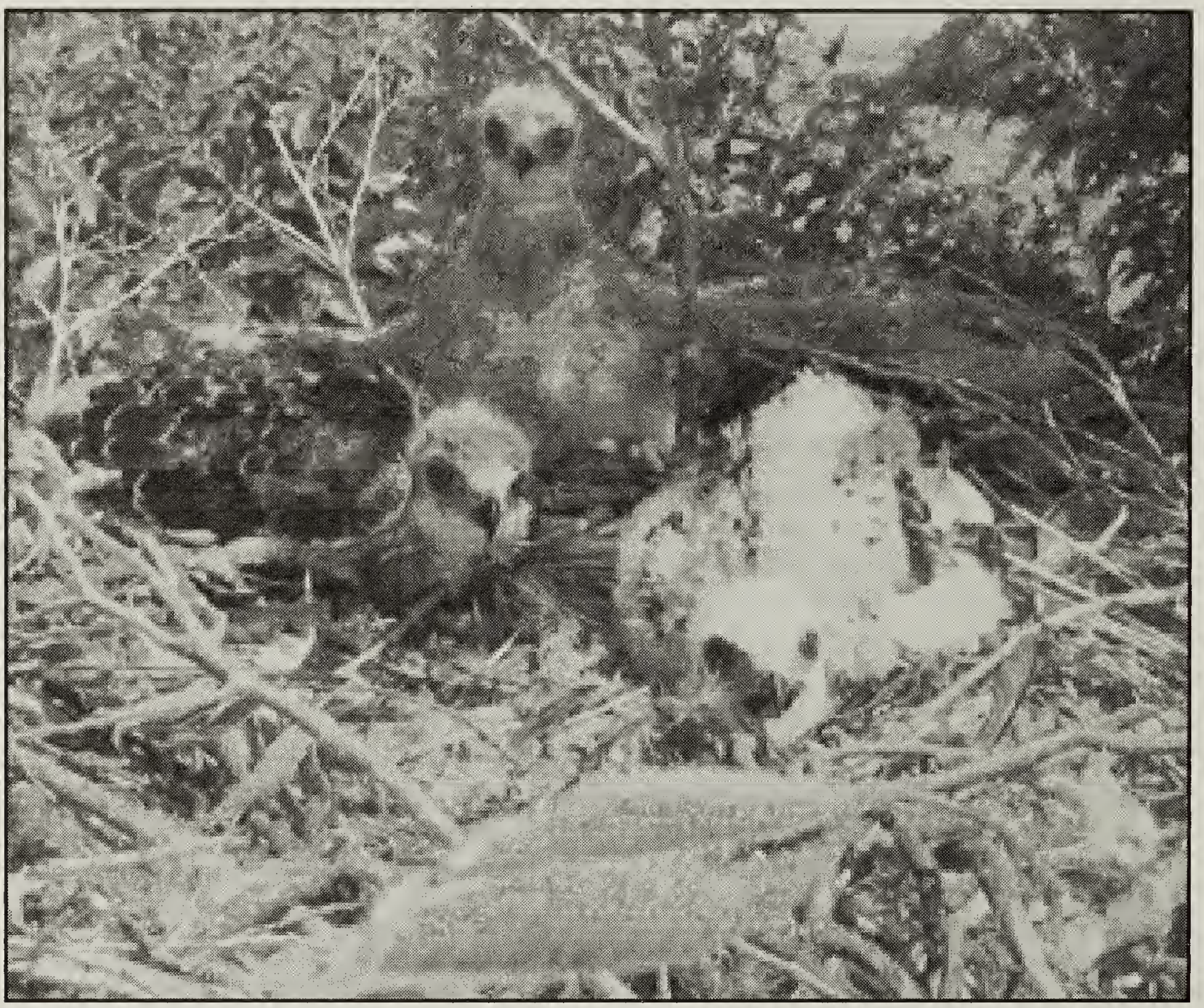

Ferruginous Hawk nestlings ***Dan Zazelenchuk***

"For some reason the goatsuckers have, for many centuries, been accused of attacking the udders of goats for food. Aristotle wrote that 'flying to the udders of she-goats, it sucked them and so it gets its name. They say that the udder withers when it has sucked at it and that the goat goes blind.'"

- Edward S. Gruson, Words for Birds, p 152

USE OF DIFFERENT CALLS BY TREE SWALLOWS DURING GROUP MOBBING OF PREDATORS

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Introduction

Mobbing is a widespread antipredator behaviour used by parent birds to defend their offspring, and is particularly common in passerines.[2] It is generally characterised by approaches toward a predator accompanied by stereotyped visual and vocal displays, and mobbing by one individual often draws other birds in the vicinity to mob the same predator, resulting in the formation of a mobbing group.[1, 5] Mobbing may serve to silence offspring, alert relatives to the presence of a predator, signal to the predator that it has been detected, confuse the predator, or cause the predator to leave the area.[1]

Tree Swallows breed in most areas of Saskatchewan, wherever there is an ample source of their main prey, flying insects. Tree Swallows are cavity nesters and will readily inhabit artificial nest boxes (Fig.1), and thus they are a convenient species for studies of nest defence.[6, 7] While they are not colonial nesters, Tree Swallows mob readily and form large mobbing groups in response to potential predators, circling and diving at the intruder while harassing it with mobbing calls. Several types of call are used during mobbing, however previous publications regarding their function have overlooked differences in the behavioural context of their use.[4, 7] Here I describe the mobbing behaviour of Tree Swallows which were responding to models of potential predators, with particular attention paid to the use of mobbing calls.

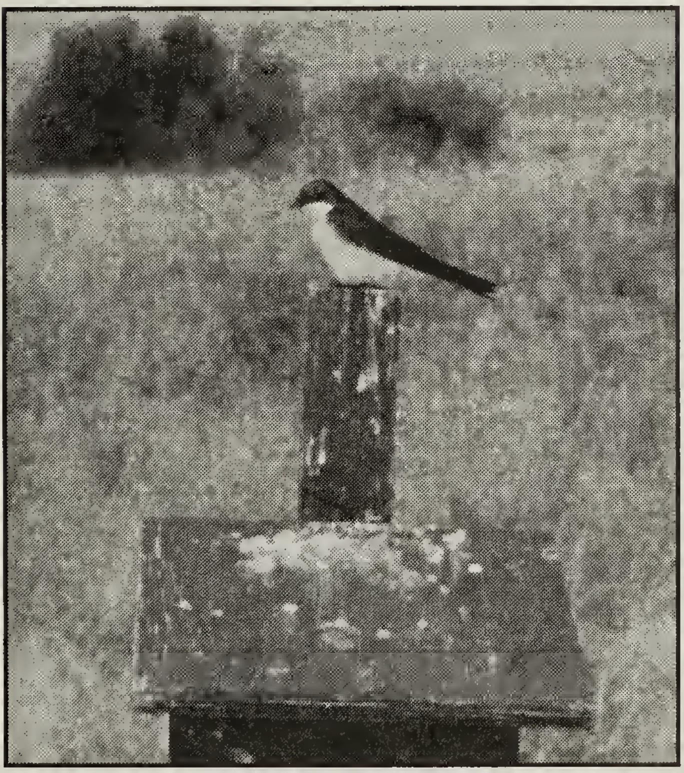

Figure 1. Adult Tree Swallow at nest box, St. Denis National Wildlife Area.
Patrick Leighton

Methods

My research was conducted from May to July, 2001 on the St. Denis National Wildlife Area (NWA), Saskatchewan. The NWA is a section and a half (389 hectares) of land characterized by rolling hills and numerous wetlands which vary in size and permanency. Vegetation is a mixture of native grassland and cropland, interspersed with aspen bluffs. One hundred and forty nest boxes are maintained on the site, mounted on metal poles at 30 m intervals along trails that traverse the NWA, and most are occupied each year by Tree Swallows.

The mobbing behavior of swallows was studied by presenting artificial mobbing stimuli at an occupied nest box. All tests were conducted during the period when the nest boxes contained nestlings. Three mobbing stimuli were used: a live ferret, a mounted Northern Goshawk, and a hawk-sized box

(10 x 10 x 30 cm) that served as a control for the presence of a foreign object near the swallow's nest box. Each mobbing trial began with the unveiling of the predator model. The ferret was hidden in an empty nest box placed next to the nest box occupied by swallows, and was unveiled by releasing it down a gangplank onto the roof of the swallow's nest box (Fig.2). The goshawk and the control hawk-sized box were placed on aluminum poles 2 m from the entrance of the nest box. Each was veiled by a green garbage bag which was then removed to reveal these predator models and begin the mobbing trial. Unveilings were performed from a distance, using monofilament line. Each presentation lasted 3 minutes and was video taped from a distance of 20 m, with additional observations recorded in a field book.

For analysis, I divided each trial into six 30-second segments. Call rates and dive rates for each segment were calculated from video tapes. I recorded the total number of visible mobbing birds at the end of each 30s segment in the field. Since there was a short delay before the unveiled predator models were detected, segment 1 was not representative of overall call rates and was therefore excluded from calculations of averages for each trial. The control hawk-sized box elicited zero mobbing response in all trials, and therefore I present only results from the 19 hawk trials and 17 ferret trials.

Results

Tree Swallows used three main types of call in the context of predator mobbing: the "shriek" call, the "tikking aggression" call, and the "rasping aggression" call, hereafter referred to as *shrieks*, *tiks*, and *rasps* respectively.[4] Here, I have divided the sequence of events during mobbing into 3 stages to highlight the use of these different mobbing calls; however, mobbing is a continuous process and the stages I describe overlap considerably.

Stage 1. Initiation of Mobbing

The initial detection of the predator elicited a rapid and persistent repetition of the *shriek* call by one or more individuals. The *shriek* call resembles an abrasive scream, a fraction of a second in duration. *Shrieks* are occasionally given in isolation, but more often in bursts of repeated calls. Bursts typically consisted of a sequence of doublets (*shriek-shriek*, *shriek-shriek*…), but sometimes also took the form of a continuous series of calls (*shriek-shriek-shriek-shriek*…).

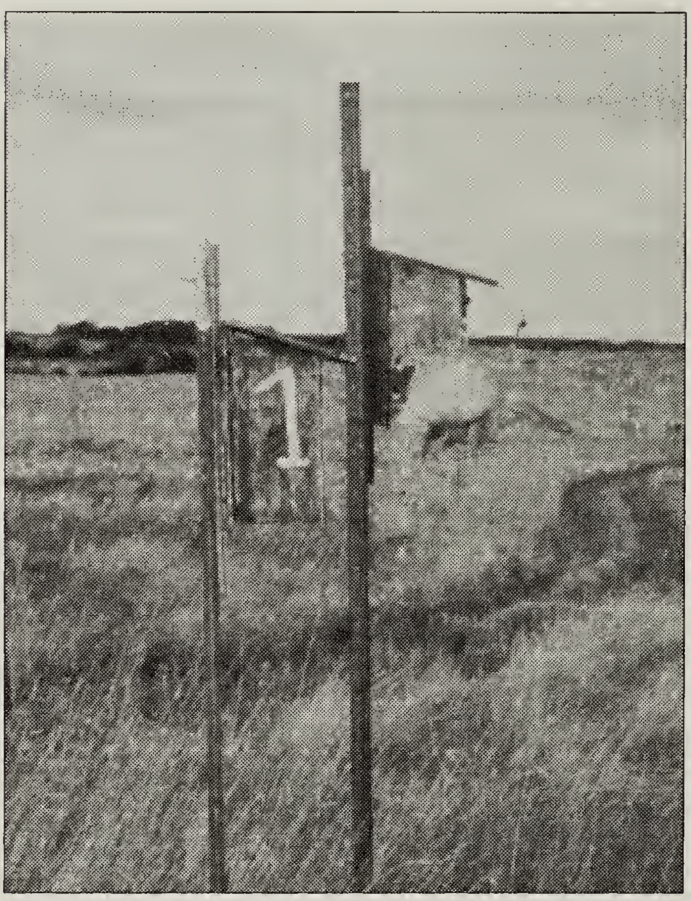

Figure 2. Domestic ferret as mobbing stimulus. ***Patrick Leighton***

During mobbing trials, predators typically were detected within 30 seconds following unveiling of the predator model. The average interval before the first *shriek* was 15 seconds ($n = 36$, $SD = 22$). Overall call rates were high, with an average of 116.2 calls/min ($n = 36$, $SD = 91.8$ calls/min) and ranging up to 336 calls/min (Table 1).

While the form and use of *shriek* calls was similar among individuals, there was considerable variation in the pitch and quality of calls of different swallows, making individual voices readily distinguishable. The vast majority of *shriek* calls during a mobbing trial were given by the same individual, and in cases where multiple individuals called, secondary callers tended to intercalate their bursts of calling with those of the primary caller, resulting in little acoustic overlap. Previous reports on mobbing by Tree Swallows also note that, for predators near an occupied nest, *shriek* calling was performed mainly by the parents, in particular the male.[6, 7]

Stage 2. Formation of Mobbing Group and Passive Mobbing

Following the initial *shriek* calls, mobbing groups assembled rapidly. Swallows foraging in the area arrived within seconds of the initial *shriek* calls and began to mob *passively*. Passive mobbing includes both circling the predator and calling, but not diving. Swallows that engaged in passive mobbing tended to limit their calling to short bursts of *shriek* calls, but also occasionally gave *tik* calls while circling (see Stage 3, below).

The average number of swallows present in the mobbing group was 5.2 (*n* = 36, *SD* = 3.3), but there was considerable variation among trials, and as many as 18 swallows mobbed simultaneously in one instance (Table 1).

Stage 3. Active Mobbing

Active mobbing consisted of dives toward the predator accompanied by two types of aggression call, *tiks* and *rasps*, and usually began once several mobbing swallows were present.

When diving, a circling swallow would alter its flight path to make a sharp, parabolic swoop towards the predator. Dives were directed at the predator's head, and with very few exceptions, were accompanied by a *tik* or *rasp* aggression call. Most active mobbing (81% of trials) involved dives that came within 0.5 m of their target, and very aggressive individuals occasionally came as close as 5 cm. Actual contact with the predator was never observed. The average dive rate was 18.8 dives/min (*n* = 36, *SD* = 15.6), with a maximum of 78 dives/min (Table 1).

While sonograms of *tiks* and *rasps* span similar frequencies, these calls are quite distinct in both form and use.[4] The *tik* call consists of 3 to 6 chipping clicks, repeated in quick succession: "*tik-tik-tik*". The call starts before the bird reaches the bottom of the dive, often spanning the entire swoop, and is also given occasionally while circling. The average *tik* rate during mobbing trials was 8.7 calls/min (*n* = 36, *SD* = 10.0), but ranged as high as 74 calls/min (Table 1).

The *rasp* call is a harsh squawk delivered like a punch at the bottom of the dive as the swallow passes next to the predator's head. It occurs most often during closer, sharper dives and, unlike the *tik* call, was observed exclusively during diving. The average *rasp* rate during mobbing trials was 10.4 calls/min (*n* = 36, *SD* = 12.1), with a maximum of 50 calls/min (Table 1).

Tiks and *rasps* were often combined into a continuous aggression call with a series of *tiks* leading up to a *rasp* at the bottom of the dive: "*tik-tik-tik-RASP*." Ten percent of the 1,528 aggression calls I recorded during mobbing trials had both a *tik* and a *rasp* component.

Discussion

The behavioural context in which I recorded *shrieks*, *tiks*, and *rasps* suggests that these three calls may be serving different functions during predator mobbing. Previous studies have shown a relationship between the rate of *shriek* calling by parent swallows defending their nest and the number of individuals in the resulting mobbing group [6, 7], suggesting that this call may alert other swallows to the presence of a predator in the area and recruit them to mob. The rapid assembly of a mobbing group which I observed following the onset of *shriek* calling supports the hypothesis of a recruitment function, however visual cues such as the sight of circling and diving swallows, or of the predator itself, are also likely to be important. High rates of *shriek* calling sustained

		Shrieks (calls/min)	*Tiks* (calls/min)	*Rasps* (calls/min)	*Dives* (dives/min)	*Swallows Present*
Time Period	**0-30 s**	86.3	8.5	5.6	14.5	4.9
	30-60 s	120.1	9.6	10.3	18.8	5.3
	60-90 s	115.0	7.9	11.5	19.8	5.2
	90-120 s	115.3	9.2	10.2	18.7	5.4
	120-150 s	110.3	9.2	10.4	18.9	5.0
	150-180 s	118.6	7.2	9.5	17.6	5.5
Minimum		0	0	0	0	0
Maximum		336	74	50	78	18
Mean*		116.2	8.7	10.4	18.8	5.2
SD		91.8	10.0	12.1	15.6	3.3

Table 1. Change in response variables over the course of a 3-minute mobbing trial. Values shown are means (averages) for each 30-second segment. Overall means are calculated excluding the first 30-second segment of each trial (see text).

throughout the mobbing event (Table 1) may be important for maintaining attendance as well as enhancing the overall sensory stimulus delivered by the mobbing group to the predator.

Tiks and *rasps* have traditionally been lumped together in terms of function, however differences in their form and use suggest that their functions may be different.[4] The placement of the *rasp* call at the bottom of the dive suggests that it may serve as an aggressive auditory attack on the predator that may be important to startle it and get it to "move on".[1] The use of *tiks* during both circling and diving suggests that their function is not uniquely a sensory attack on the predator, and *tiks* may in fact be contributing more to confusing the predator by drawing its attention to many circling individuals.[1] In the context of diving, *tiks* during the descent may be important in drawing the attention of the predator to the incoming stimulus of a swooping swallow since contact is rarely made. These functional distinctions remain speculative, however, and future work examining the behaviour of predators being mobbed would do much to clarify the roles of different aggression calls in the mobbing context.

Acknowledgements

I thank Don Kramer and Bob Clark for their excellent supervision and for comments on an earlier version of the manuscript, the Canadian Wildlife Service for use of the NWA and equipment, Ian Shirley for use of video equipment, Thierry Deux for help in the field, and Dennilyn Parker and her ferret Hobo for their amiable cooperation.

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MAMMALS

SQUIRREL TAILS TIED IN KNOTS

GARY HOIUM, Box 626, Weyburn, SK S4H 2K7

As an avid hockey fan and former player, I was sitting in my basement in Weyburn one evening in May 2003 watching a NHL playoff game when the phone rang. Some 19 years of rural veterinary practice had taught me to expect emergency calls at such times, but I was at a loss for words when the three anxious gentlemen on the line asked me to come over right away to a nearby seniors complex to solve a *squirrel* problem. A mass of squirrels with their tails tied together had been spotted, and the pensioners had been watching the octopus-like, grey furry formation moving erratically around the back lawn and parking area. Something had to be done! I paused and sniffed the phone receiver for alcohol. None! So we were all sober. Was this for real? "Maybe you should call the humane society," I responded hopefully, " I think they do squirrels after hours." The gentlemen quickly informed me that the police and the humane society had already been consulted and had voted unanimously that I be called. "Can't you just grab hold of them and pull them apart?" I asked. "Oh no way," they replied, "we tried; they scream and try to bite."

I called to my wife, "Shelley, we're going on a squirrel call." When we arrived, spectators were crowded behind every window. And there it was, a quartet of nearly-grown squirrels solidly joined by their tails and each pulling in a different direction. The squirrels were grey on the back and sides, with yellow-tan bellies, cheeks, chins and highlights on the back sides of the ears and on the feet, all indications that these were Eastern Fox Squirrels, although Eastern

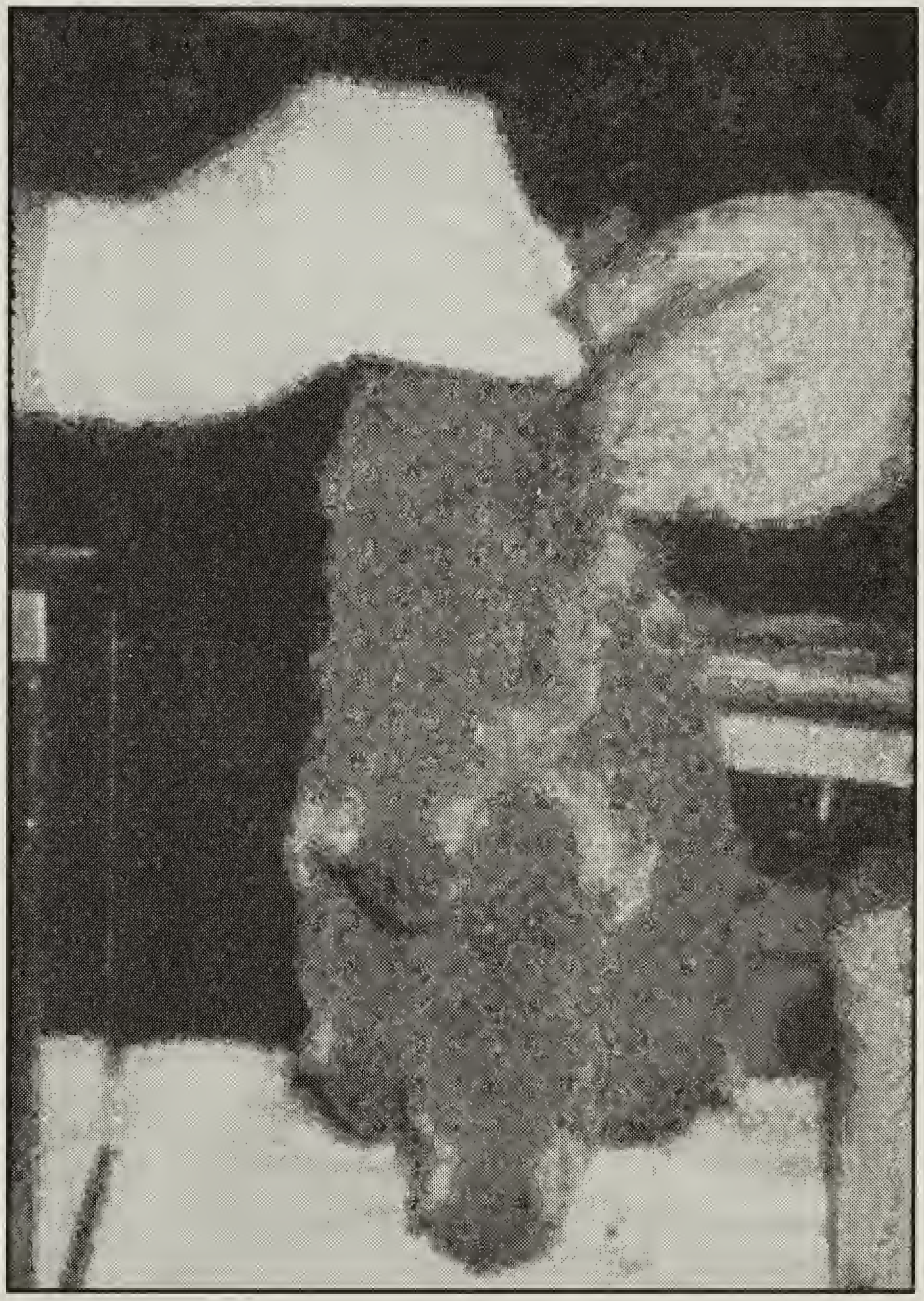

Figure 1. The four young Eastern Fox Squirrels with their tails tied together, anaesthetized and ready for untangling. ***Gary Hoium***

Grey Squirrels also occur in the area and the two species are not easily distinguished. As I approached, the retreating formation got hooked on a short rose bush and I captured it with an overturned cardboard box. We transferred the angry, sore and frightened squirrels to a firmer container and returned to my clinic, very proud " first responders". Anaesthetic gas soon had the squirrels quiet and motionless. I removed them from the chamber and, as the squirrels hung from their entanglement, they reminded me of a chain of freshly-caught perch (Fig 1). "Time for a bath, boys and girls."

It took less than 5 minutes to successfully untangle and separate the squirrels. The tails were so entangled, it was as if someone had literally taken these squirrels and tied their tails together the way we would tie our shoes. Dried, crusted faecal matter and debris served to cement and reinforce this intimate relationship of tails. After soaking and dissolving and picking off the solidified organic matter from this mass, I still had to forcefully untie three or four real knots. Indeed, after separation, all the tails appeared disjointed and misaligned, suggesting dislocation and/or fracture of some of the tail vertebrae. Thus there may have been some permanent damage to the tails. Had the tangled squirrels been left to fend for themselves, it seems likely that the tail tissue would have died, if the squirrels did not die first, and some tail-less young squirrels would have been the result.

By the time the washing and disentanglement was complete, it was dark and cold outside, so I decided to let the squirrels wake up and recover in a large portable dog kennel in the warmth of my heated garage. Release was scheduled for 7:45 a.m. the next morning, back at the capture site. Despite the hour, a large audience was again assembled behind the lawn-facing windows. I located a grassy spot adjacent to the building and poured the squirrels out onto the lawn. They literally hit the ground running, each in a different direction and this time successfully! Mission accomplished.

Although I fully believe this was a natural phenomenon, initially I might easily have been convinced that it was a practical joke. My theory as to why and how tails become entangled and knotted in this way is that some sticky substance like tree sap or loose stool first coats the tails and glues them together as the squirrels cuddle in the nest. The glue holds the tails together as the squirrels move around each other, and knotted tails are the result. Further strengthening the bond is additional faecal matter inevitably deposited on the joined tails. A resident at the seniors' complex had a different theory: "The mother squirrel ties them together like that when the babies get older so she can keep track of them all when they escape their nest."

I have since learned that squirrels with their tails stuck and tied together have been seen elsewhere. Doug Campbell of the Canadian Cooperative Wildlife Health Centre at the Ontario Veterinary College once received a cluster of eight Eastern Gray Squirrels in this condition, all of them found dead in a cemetery in Toronto (Fig 2). Young Norway Rats also are reported to develop tangled, knotted tails. Doug Campbell reports that, upon seeing the photo shown here as Fig 2, a gentleman in Erin, Ontario told him that he had seen the same thing in rats in Holland. He said it was a well-known phenomenon, and was called a "king of rats." His point is strengthened by the following quotation:

"Surely there are many stories of rat cooperation and even compassion. A good example is the famous Rattenkonig or 'rat king'. Young rats close to one another in the nest sometimes get their tails entangled and become a living Gordian knot glued together by dirt encrusted wounds and the like. When they try to pull apart the tails are pulled

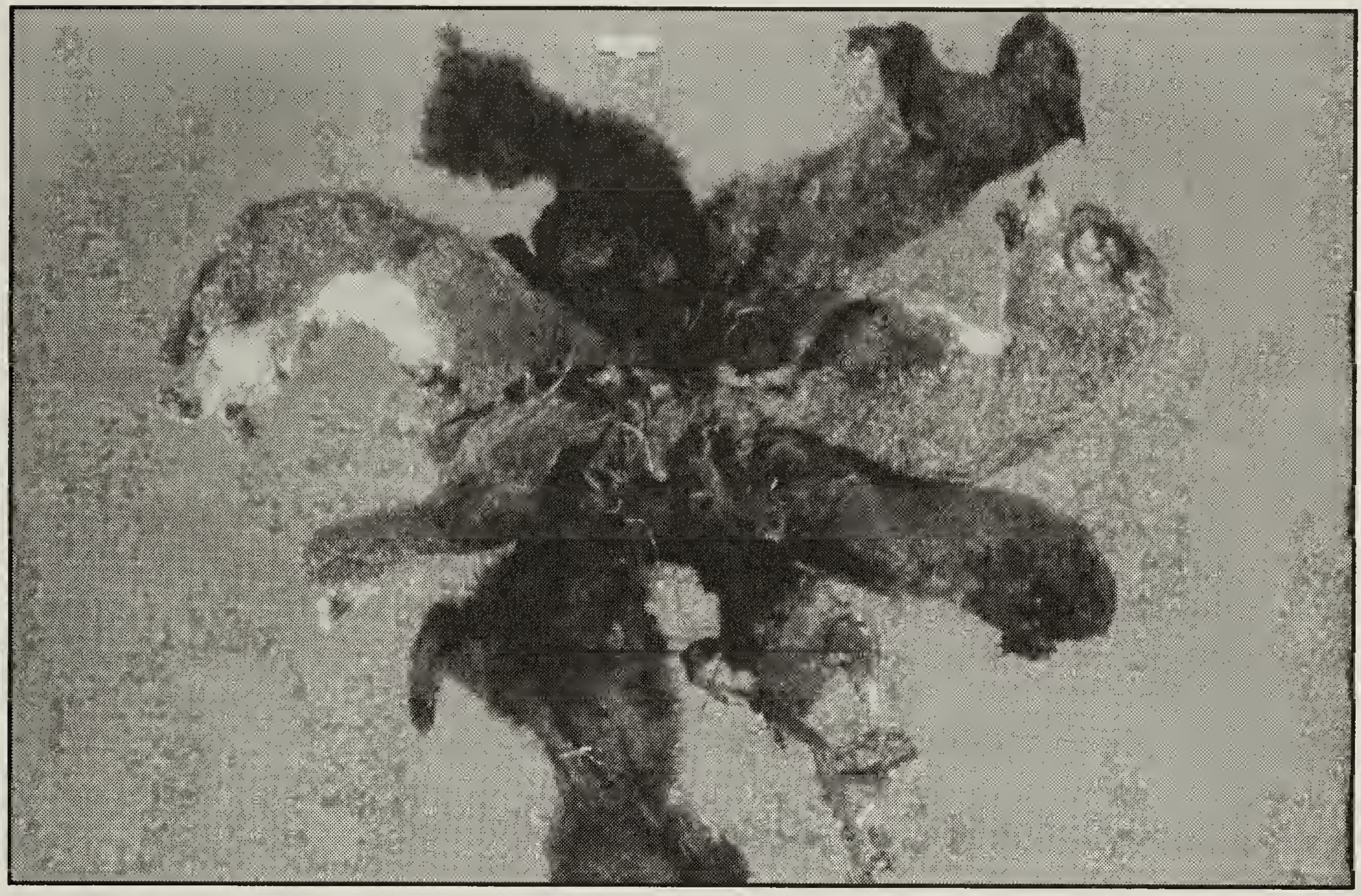

Figure 2. Eight Eastern Grey Squirrels with their tails entangled and tied together. These tangled squirrels were found dead near Toronto, ON. Both grey and black colour variants are present in the group. ***Doug Campbell***

tight, and the knots strengthen, knitting the rats together. As many as 32 rats are trapped in these knots and have died as a result of being unable to forage for themselves. However, they are often unselfishly fed for life by other family members." [1]

[1] HENDRICKSON, R. 1999. More Cunning than Man: A Social History of Rats and Men; Dorset Press, New York; pp. 92 - 93.

[Editors' Note: During the editorial process for this interesting article, it became evident that the accidental knotting of tails is well known to persons who offer medical care to injured wildlife and who live within the range of the Eastern Grey Squirrel. Sandie Black of the Calgary Zoo reports that the zoo received and treated six such knots of Eastern Grey Squirrels between 1987 and 1993, a period during which the zoo's veterinary staff accepted wild animals for treatment. Three cases consisted of four-squirrel knots, two of five squirrels, and one of six squirrels. In several cases, the tails were severely damaged and required amputation. Numerous Internet web sites also document this phenomenon; some even give instructions for disentangling the squirrels. All explanations offered for this phenomenon conform to the hypothesis proposed above by Gary Hoium. We encountered no information about other instances involving fox squirrels. - Editors]

"The squirrel is a tiny animal that is very easily angered. It is said that because of their nature squirrels often die of blind rage."

A Cloisters Bestiary, p 14 (compiled from medieval texts)

30th AND 31st ANNUAL SASKATCHEWAN CHRISTMAS MAMMAL COUNTS - 2002 AND 2003

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Introduction

I would like to apologize to readers for the delay in presenting the results of the 30th and 31st Saskatchewan Christmas Mammal Counts (CMCs) for 2002 and 2003. It is a testament to the hard work of the previous compiler, the late Wayne Harris, that for 13 years he was able to compile the results of both the Christmas Bird and Mammal Counts and present them in timely fashion for publication in *Blue Jay*.

In order to partially redress this delay in what has become, in its own right, an important activity of members of Nature Saskatchewan, I have not only compiled the results of these last two counts, but I have summarized the results of the last 31 years of mammal counts. Readers should note that some changes have been made in the presentation of the mammal counts from previous years. This was done to harmonize them with the bird counts, and to simplify the task of tabulating an increasingly large number of counts. The number of mammals actually seen (or, more rarely, heard) on count day is recorded separately from those detected by other means or recorded during the count period but not on count day. Thus mammals detected on count day on the basis of tracks are indicated with the letter “t”, those by other means (dead animals or clearly identifiable chewing, digging, dens or lodges) by the letter “o”, those recorded during the count period but not on count day by the letter “c”.

For weather, coverage and participants for the 2002 CMC, I refer readers to the March 2003 issue of *Blue Jay*, (Vol. 61, No. 1) and for the 2003 count to the March 2004 issue (Vol. 62, No. 1).

The 30th Christmas Mammal Count-2002

Counts (Table 1) were received from 89 localities, which is down from the record high of 102 set in 2001. The 33 species seen on count day tied the 1991 record. Indian Head had the most species seen or heard on count day (13), while honours for the most species present over the entire count period (15) were shared between Candle Lake and Prince Albert National Park.

The most abundant mammal was the White-tailed Deer, closely followed by its cousin the Mule Deer. The American Red Squirrel and Pronghorn placed third and fourth. The most frequently seen mammals were the White-tailed Deer seen on 60% of all counts, Coyote on 56%, American Red Squirrel on 55%, and Mule Deer on 30%. While Mule Deer were much less often seen than were white-tails, they occurred in larger numbers when they were seen.

The only new species in 2002, and the first since 1996, was a jumping mouse, either a Meadow Jumping Mouse or Western Jumping Mouse. The species was noted on the basis of its distinctive tracks on the Clark’s Crossing count. Also noteworthy was the Richardson’s Ground Squirrel seen on the Saskatoon count. The eight Mule Deer seen on the Porcupine Plain count were at the northeastern limit of their range. The 73 American Red Squirrels tallied on the Fort

Walsh count may have been a record high count for the species on a CMC.

The 31st Christmas Mammal Count-2003

Ninety-one counts were completed in 2003 (Table 2.), two more than in 2002. The 35 species seen on count day set a new record. Indian Head had the most species seen or heard on count day (14), while Regina recorded 16 species over the count period.

The three most abundant species were no surprise: White-tailed Deer followed by Mule Deer and American Red Squirrel. However, Elk, as the fourth most common species, was a surprise. The four species most frequently seen were the same as in 2002. White-tailed Deer were seen on 69% of all counts, American Red Squirrel on 58%, Coyote on 52%, and Mule Deer on 30%.

Two new species, Thirteen-lined Ground Squirrel and Least Chipmunk, were added on this count. Although Thirteen-lined Ground Squirrels were seen during the count period in 1987 and 1991, the 2003 sighting from Craven was the first sighting on count day. Chipmunks were reported twice on count day. One was seen at Archerwill, and tracks were noted at Saskatoon. Mammal counters from Craven seemed to be going "squirrelly" as they also counted four of each of the tree squirrels, the Grey, Fox and American Red.

Summary of Christmas Mammal Counts 1973-2003

Wayne Harris began compiling the information on mammals counted incidentally on Christmas Bird Counts (CBCs) beginning in 1973 (Table 3). At that time, eleven mammal species were reported from eight of 46 CBCs published in *Blue Jay*.[1] Interest rapidly grew; by the end of the decade, over 70% of CBCs had a CMC as well. By the mid-1990s, the figure had risen to over 90%. To date, 1,972 mammal counts have been conducted in almost 300 localities.

According to Wapple, 79 species of wild mammals have been recorded in Saskatchewan.[2] The Christmas Mammal Count has provided evidence for the occurrence of 55 species (feral horses and cats are excluded). Of these, 49 species have actually been seen on count day. One other species, the American Water Shrew, has been seen during the count period, three others have been recorded on the basis of dead animals, and two others have been recorded only on the basis of tracks.

Although the data from the CMCs have not yet been subjected to a statistical analysis, a cursory examination of data from the last 32 years suggests that there have been major changes in the province's mammal population over this period. Among the more obvious and interesting are:

1. The arrival and spread of the Fox Squirrel.
2. Increasing appearance of ground squirrels, Black-tailed Prairie Dogs and Least Chipmunks. These species should be hibernating during the count period. Their appearance on CMCs may be an indication of a warming climate.
3. The increase in the populations of all the ungulates, and the spread of Moose and Elk onto the plains.

Thanks to the foresight of Wayne Harris, we now have information with which to conduct more detailed analysis of the population trends and distributional changes of Saskatchewan mammals.

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Table 1. 30th Saskatchewan Christmas Mammal Count-2002.

Species	Archerwill, 27 Dec 2002	Armit, 4 Jan 2003	Bangor, 23 Dec 2002	Biggar, 27 Dec 2002	Birch Hills, 16 Dec 2002	Brightwater, 20 Dec 2002	Broadview, 27 Dec 2002	Bromhead, 2 Jan 2003	Cabri, 27 Dec 2002	Candle Lake, 31 Dec 2002	Clark's Crossing, 14 Dec 2002	Coronach, 22 Dec 2002
Shrew species					t							
Nuttall's Cottontail												o
Snowshoe Hare	t	t		t	1		t			t	1	
White-Tailed Jack Rabbit			3					2			2	
Richardson's Ground Squirrel												
Black-Tailed Prairie Dog												
Grey Squirrel							3					
Fox Squirrel												
American Red Squirrel	1	1	1		2		2			5	1	
Northern Flying-Squirrel												
American Beaver												
Deer Mouse												
Muskrat												
Meadow Vole												
Vole species					t		t	t		t		
Jumping Mouse species											t	
Mouse species	t	t										
Norway Rat												
House Mouse												
American Porcupine	t					1	t			1		
Coyote	1			2	2	4	t	1		t	4	1
Wolf										t		
Red Fox	t		1					t			1	
Raccoon					t							
American Marten												
Fisher										t		
Ermine					t		t	t		t		
Long-tailed Weasel					t		t			t		
Least Weasel					t		t			t		
Weasel species	c											
American Mink										t		
American Badger												
Striped Skunk												
River Otter												
Lynx							t			1		
Woodland Caribou												
Mule Deer	c			6								18
White-tailed Deer	5	3	4	3	2		t	27	1	8	20	4
Deer species												
Moose	t	t					t			t		
Elk		t								t		
Moose/Elk												
Pronghorn												
Totals seen/heard on count day	7	4	9	11	7	5	5	30	1	15	29	23
Total species seen/heard	3	2	4	3	4	2	2	3	1	4	6	3
Total species recorded by tracks	5	4	0	1	6	0	10	3	0	11	1	0
Total species otherwise recorded	0	0	0	0	0	0	0	0	0	0	0	1
Species recorded count period	2	0	0	0	0	0	0	0	0	0	0	0
Total species count period and day	10	6	4	4	10	2	12	6	1	15	7	4

Table 1. 30th Saskatchewan Christmas Mammal Count-2002.

Species	Craven, 14 Dec 2002	Crooked Lake, 4 Jan 2003	Crystal Lake, 3 Jan 2003	Cypress Hills P.P., 30 Dec 2002	Duck Lake, 16 Dec 2002	Dundurn, 4 Jan 2003	Eastend, 1 Jan 2003	Emma Lake, 16 Dec 2002	Endeavour, 22 Dec 2002	Estevan, 23 Dec 2002	Estuary North, 2 Jan 2003	Fenton, 14 Dec 2002
Shrew species					t							
Nuttall's Cottontail							t				3	
Snowshoe Hare	2	t			t	t		t				t
White-Tailed Jack Rabbit	1					t						t
Richardson's Ground Squirrel												
Black-Tailed Prairie Dog												
Grey Squirrel												
Fox Squirrel	2									3		
American Red Squirrel	6	9		10	41			22	1			5
Northern Flying-Squirrel								c				
American Beaver	o	o										1
Deer Mouse	t						t		1			t
Muskrat												
Meadow Vole									2			
Vole species							t					t
Jumping Mouse species												
Mouse species						t						
Norway Rat												
House Mouse												
American Porcupine				1	t					1	3	1
Coyote		2	1	t	1	2	2		t	2	14	3
Wolf												
Red Fox								c			1	
Raccoon								1				
American Marten												
Fisher								c				
Ermine												t
Long-tailed Weasel												t
Least Weasel												
Weasel species							t					
American Mink		2		t		t	c					
American Badger												
Striped Skunk							c					
River Otter												
Lynx												
Woodland Caribou												
Mule Deer	4	c				13	1				15	
White-tailed Deer	5	t		4		3		t	t	3	24	5
Deer species					t							
Moose									2			
Elk					t				t			
Moose/Elk							t					
Pronghorn											15	
Totals seen/heard on count day	20	13	1	15	42	18	3	23	6	9	75	15
Total species seen/heard	6	3	1	3	2	3	2	2	4	4	7	5
Total species recorded by tracks	1	2	0	2	5	4	5	2	3	0	0	6
Total species otherwise recorded	1	1	0	0	0	0	0	0	0	0	0	0
Species recorded count period	0	1	0	0	0	0	2	3	0	0	0	0
Total species count period and day	8	7	1	5	7	7	9	7	7	4	7	11

Table 1. 30th Saskatchewan Christmas Mammal Count-2002.

Species	Fort Qu'Appelle, 16 Dec 2002	Fort Walsh, 14 Dec 2002	Gardiner Dam, 16 Dec 2002	Good Spirit Lake, 1 Jan 2003	Govenlock, 15 Dec 2002	Grasslands, N.P., 2 Jan 2003	Harris, 18 Dec 2002	Indian Head, 28 Dec 2002	Kamsack, 5 Jan 2003	Kelvington, 27 Dec 2002	Kenaston, 28 Dec 2002	Kenosee Lake, 31 Dec 2002
Shrew species		1						1				
Nuttall's Cottontail		3	1		1	3					t	
Snowshoe Hare				t			1	8	17	t		
White-Tailed Jack Rabbit		1						23		t	t	
Richardson's Ground Squirrel												
Black-Tailed Prairie Dog						100						
Grey Squirrel	1							1				
Fox Squirrel												
American Red Squirrel	7	73		2				38	3	2		2
Northern Flying-Squirrel									2			
American Beaver	1											o
Deer Mouse	1							16			1	
Muskrat	c											o
Meadow Vole		1			1							
Vole species				t				14				
Jumping Mouse species												
Mouse species										t		
Norway Rat										t		
House Mouse	5											
American Porcupine		2	1		2		2	2			t	
Coyote	c	8	4	6	4	16	2	42	2	t	1	
Wolf									5			
Red Fox	1			t			t	5	2	t	1	
Raccoon										t	t	
American Marten												
Fisher												
Ermine												
Long-tailed Weasel								5			t	
Least Weasel												
Weasel species				t								
American Mink								t				
American Badger		o			2							
Striped Skunk											t	
River Otter												
Lynx									t			
Woodland Caribou												
Mule Deer		41	20		23	90	35	18			2	
White-tailed Deer	2	45	20	15		164	1	47	32	4	15	23
Deer species												
Moose				t					3		t	
Elk		38							2			
Moose/Elk												
Pronghorn					65	148					t	
Totals seen/heard on count day	18	213	46	23	98	521	41	220	68	6	20	25
Total species seen/heard	7	10	5	3	7	6	5	13	9	2	5	2
Total species recorded by tracks	0	0	0	5	0	0	1	1	1	7	8	0
Total species otherwise recorded	0	1	0	0	0	0	0	0	0	0	0	2
Species recorded count period	2	0	0	0	0	0	0	0	0	0	0	0
Total species count period and day	9	11	5	8	7	6	6	14	10	9	13	4

Table 1. 30th Saskatchewan Christmas Mammal Count-2002.

Species	Ketchen North, 26 Dec 2002	Kilwinning, 17 Dec 2002	Kindersley North, 26 Dec 2002	Kinistino, 18 Dec 2002	Kinloch, 17 Dec 2002	Kutawagan Lake, 27 Dec 2002	La Ronge North, 14 Dec 2002	La Ronge South, 21 Dec 2003	Last Mountain L., 29 Dec 2002	Leader North, 29 Dec 2002	Love, 27 Dec 2002	Luseland, 30 Dec 2002
Shrew species												
Nuttall's Cottontail										6		t
Snowshoe Hare			t		t		t	t				
White-Tailed Jack Rabbit						t			t	2		t
Richardson's Ground Squirrel												
Black-Tailed Prairie Dog												
Grey Squirrel												
Fox Squirrel												
American Red Squirrel	1	7		1	4		6	1			6	
Northern Flying-Squirrel												
American Beaver					o			o				
Deer Mouse												c
Muskrat												
Meadow Vole												
Vole species						t						
Jumping Mouse species												
Mouse species				t			t					
Norway Rat												
House Mouse										1		
American Porcupine					t					3		t
Coyote	1		3	2	t	t	1	t	t		t	1
Wolf								t				
Red Fox							t	t	t		t	t
Raccoon												
American Marten												
Fisher												
Ermine					t							
Long-tailed Weasel	c											t
Least Weasel												c
Weasel species							t					
American Mink												
American Badger												
Striped Skunk												
River Otter												
Lynx					t			t				
Woodland Caribou								t				
Mule Deer			4		t	9				20		10
White-tailed Deer				5	1					10	14	c
Deer species							t		t			
Moose					t							t
Elk					t							
Moose/Elk												
Pronghorn												
Totals seen/heard on count day	2	7	7	8	5	9	7	1	0	42	20	11
Total species seen/heard	2	1	2	3	2	1	2	1	0	6	2	2
Total species recorded by tracks	0	0	1	1	8	3	5	6	4	0	2	6
Total species otherwise recorded	0	0	0	0	1	0	0	1	0	0	0	0
Species recorded count period	1	0	0	0	0	0	0	0	0	0	0	3
Total species count period and day	3	1	3	4	11	4	7	8	4	6	4	11

Table 1. 30th Saskatchewan Christmas Mammal Count-2002.

Species	MacDowall, 2 Jan 2003	Matador, 2 Jan 2003	Mayview, 3 Jan 2003	Meadow Lake, 26 Dec 2002	Missinipe, 4 Jan 2002	Moose Mountain, 31 Dec 2002	Nipawin, 26 Dec 2002	Nisbet Forest West, 1 Jan 2003	Paddockwood S, 3 Jan 2003	Pike Lake, 4 Jan 2003	Porcupine Plain, 26 Dec 2002	Preeceville, 1 Jan 2003
Shrew species												
Nuttall's Cottontail		t										
Snowshoe Hare	t			t	t		t		1		t	
White-Tailed Jack Rabbit	t	t							t			t
Richardson's Ground Squirrel												
Black-Tailed Prairie Dog												
Grey Squirrel												
Fox Squirrel						1						
American Red Squirrel	6		2	1	t	3	2	3		11		1
Northern Flying-Squirrel												
American Beaver				o								
Deer Mouse										t		
Muskrat				o	t							
Meadow Vole			2						3			
Vole species	t											
Jumping Mouse species												
Mouse species				t								
Norway Rat												
House Mouse												
American Porcupine	t	2								1		
Coyote	t	10	2	t	t			1	5	15	t	20
Wolf				t	t							
Red Fox	t			t				1		t		1
Raccoon												
American Marten												
Fisher												
Ermine	t			c						1		
Long-tailed Weasel	t											
Least Weasel												
Weasel species					t						t	
American Mink												
American Badger												
Striped Skunk										t		1
River Otter				t								
Lynx					t							
Woodland Caribou												
Mule Deer		155								5	8	
White-tailed Deer	t	42		t				t		12	t	25
Deer species					t				10	1		
Moose	t											t
Elk		24									t	
Moose/Elk												
Pronghorn		32										
Totals seen/heard on count day	6	265	6	1	0	4	2	5	19	46	8	48
Total species seen/heard	1	6	3	1	0	2	1	3	4	6	1	5
Total species recorded by tracks	10	2	0	7	8	0	1	1	1	3	5	2
Total species otherwise recorded	0	0	0	2	0	0	0	0	0	0	0	0
Species recorded count period	0	0	0	1	0	0	0	0	0	0	0	0
Total species count period and day	11	8	3	11	8	2	2	4	5	9	6	7

Table 1. 30th Saskatchewan Christmas Mammal Count-2002.

Species	Prince Albert, 15 Dec 2002	Prince Albert N.P., 13 Dec 2002	Qu'Appelle Dam, 15 Dec 2002	Raymore, 26 Dec 2002	Regina, 26 Dec 2002	Roulean, 28 Dec 2002	Round Lake, 28 Dec 2002	Sk. Landing P.P., 17 Dec 2002	Sk. River Forks, 18 Dec 2002	Saskatoon, 26 Dec 2002	Shamrock, 27 Dec 2002	Skull Creek, 26 Dec 2002
Shrew species												
Nuttall's Cottontail			1					4				6
Snowshoe Hare	t	t	3	t	t		t		t	2		
White-Tailed Jack Rabbit	t				25	t	t	1		8		2
Richardson's Ground Squirrel										1		
Black-Tailed Prairie Dog												
Grey Squirrel					2							
Fox Squirrel					6							
American Red Squirrel	5	35					4		12	3		2
Northern Flying-Squirrel												
American Beaver	1			o			o	1				
Deer Mouse				t	t					2		
Muskrat			1					1				
Meadow Vole					t							
Vole species										t		
Jumping Mouse species										t		
Mouse species	t	3									t	
Norway Rat												
House Mouse												
American Porcupine	t	t								2		3
Coyote	t	t	2	5	1		c	2	t	9	3	5
Wolf	t	13										
Red Fox		2		t	1	c				t	1	1
Raccoon												t
American Marten		t										
Fisher		t										
Ermine				t	t							
Long-tailed Weasel					t							2
Least Weasel												
Weasel species											t	
American Mink		t					1	1		2		2
American Badger												2
Striped Skunk												
River Otter		3										
Lynx	t	t										
Woodland Caribou												
Mule Deer			20					39			25	70
White-tailed Deer	1	12	6	5	1		11	17	t	25	8	50
Deer species						t						
Moose		t										
Elk		50		t			1					
Moose/Elk												
Pronghorn						8		12				
Totals seen/heard on count day	7	118	33	10	36	8	17	78	12	54	37	145
Total species seen/heard	3	7	6	2	6	1	4	9	1	9	4	11
Total species recorded by tracks	7	8	0	5	5	2	2	0	3	3	2	1
Total species otherwise recorded	0	0	0	1	0	0	1	0	0	0	0	0
Species recorded count period	0	0	0	0	0	1	1	0	0	0	0	0
Total species count period and day	10	15	6	8	11	4	8	9	4	12	6	12

Table 1. 30th Saskatchewan Christmas Mammal Count-2002.

Species	Snowden, 31 Dec 2002	Somme, 4 Jan 2003	Spalding, 5 Jan 2003	Spinney Hill, 23 Dec 2002	Squaw Rapids, 5 Jan 2003	Stockholm, 26 Dec 2002	Swift Current, Dec 2002	Tisdale, 25 Dec 2002	Togo, 2 Jan 2003	Turtle Lake, 4 Jan 2003	Turtleford, 29 Dec 2002	Waseca, 27 Dec 2002
Shrew species			t									
Nuttall's Cottontail							5					
Snowshoe Hare	t		t	t	2			t	1		1	t
White-Tailed Jack Rabbit		3				1	1					
Richardson's Ground Squirrel											c	
Black-Tailed Prairie Dog												
Grey Squirrel			1				9					
Fox Squirrel												
American Red Squirrel	21	6		6	10				3	2	3	4
Northern Flying-Squirrel									4			
American Beaver								o				
Deer Mouse	t	c										
Muskrat												
Meadow Vole											1	1
Vole species			t		t							
Jumping Mouse species												
Mouse species												
Norway Rat												
House Mouse			t									
American Porcupine				1							t	
Coyote	t	4	t	2	12		2		1		2	1
Wolf					1							
Red Fox			t			1	1	t				t
Raccoon											t	
American Marten												
Fisher												
Ermine						c						
Long-tailed Weasel	1	1										
Least Weasel	1				t							
Weasel species												t
American Mink		c					2					
American Badger							o				o	
Striped Skunk									1		o	
River Otter					2							
Lynx												
Woodland Caribou												
Mule Deer				10			69	1			t	
White-tailed Deer	8	45	t	4	4	2	30	4			t	1
Deer species												
Moose					3							
Elk		2			t							
Moose/Elk												
Pronghorn												
Totals seen/heard on count day	31	61	1	23	34	4	119	5	10	2	7	7
Total species seen/heard	4	6	1	5	7	3	8	2	5	1	4	4
Total species recorded by tracks	3	0	7	1	3	0	0	2	0	0	4	3
Total species otherwise recorded	0	0	0	0	0	0	1	1	0	0	2	0
Species recorded count period	0	2	0	0	0	1	0	0	0	0	1	0
Total species count period and day	7	8	8	6	10	4	9	5	5	1	11	7

Table 1. 30th Saskatchewan Christmas Mammal Count-2002.

Species	Watson, 1 Jan 2003	Weyburn, 28 Dec 2002	White Bear, 27 Dec 2002	Whitewood, 29 Dec 2002	Yorkton, 28 Dec 2002	Totals seen/heard on count day	# Counts seen/heard	# Counts recorded by tracks	# Counts otherwise recorded	# Counts count period	# of Counts count period & day
Shrew species						2	2	3	0	0	5
Nuttall's Cottontail			c			33	10	4	1	1	16
Snowshoe Hare				3		43	13	32	0	0	45
White-Tailed Jack Rabbit	t	2	3	1		81	17	15	0	0	32
Richardson's Ground Squirrel						1	1	0	0	1	2
Black-Tailed Prairie Dog						100	1	0	0	0	1
Grey Squirrel						17	6	0	0	0	6
Fox Squirrel		1		1		14	6	0	0	0	6
American Red Squirrel					1	406	51	1	0	0	52
Northern Flying-Squirrel						6	2	0	0	1	3
American Beaver				o		4	4	0	10	0	14
Deer Mouse				t		21	5	8	0	2	15
Muskrat				o		2	2	1	3	1	7
Meadow Vole						11	7	1	0	0	8
Vole species						14	1	12	0	0	13
Jumping Mouse species						0	0	1	0	0	1
Mouse species						3	1	10	0	0	11
Norway Rat						0	0	1	0	0	1
House Mouse						6	2	1	0	0	3
American Porcupine						29	17	10	0	0	27
Coyote	t	2	3	2		246	52	20	0	2	74
Wolf						19	3	5	0	0	8
Red Fox	t		1	t		22	16	20	0	2	38
Raccoon	t					1	1	6	0	0	7
American Marten						0	0	1	0	0	1
Fisher						0	0	2	0	1	3
Ermine				t		1	1	10	0	2	13
Long-tailed Weasel						9	4	8	0	1	13
Least Weasel						1	1	4	0	1	6
Weasel species						0	0	7	0	0	7
American Mink						10	6	5	0	2	13
American Badger				c		4	2	0	3	1	6
Striped Skunk						2	2	2	1	1	6
River Otter						5	2	1	0	0	3
Lynx						1	1	7	0	0	8
Woodland Caribou						0	0	1	0	0	1
Mule Deer	t		64			795	28	3	0	1	32
White-tailed Deer		95	6	7	2	942	56	11	0	1	68
Deer species						11	2	5	0	0	7
Moose				t		8	3	12	0	0	15
Elk						117	6	8	0	0	14
Moose/Elk						0	0	1	0	0	1
Pronghorn						280	6	0	0	0	6
Totals seen/heard on count day	0	100	77	14	3	3267					
Total species seen/heard	0	4	5	5	2		33				
Total species recorded by tracks	5	0	0	4	0			30			
Total species otherwise recorded	0	0	0	2	0				5		
Species recorded count period	0	0	1	1	0					16	
Total species count period and day	5	4	6	12	2						38

Table 2. 31st Saskatchewan Christmas Mammal Count-2003.

Species	Archerwill, 4 Jan 2004	Armit, 3 Jan 2004	Bangor, 27 Dec 2003	Biggar, 27 Dec 2003	Big River, 2 Jan 2004	Birch Hills, 21 Dec 2003	Brightwater, 30 Dec 2003	Broadview, 23 Dec 2003	Bromhead, 14 Dec 2003	Calder, 28 Dec 2003	Candle Lake, 28 Dec 2003	Clark's Crossing, 20 Dec 2003
Shrew Species						t		t				
Nuttall's Cottontail												
Snowshoe Hare						2		t		t	t	t
White-tailed Jack Rabbit	1		2				1	t	t			
Richardson's Ground Squirrel												
13-lined Ground Squirrel												
Least Chipmunk	1											
Grey Squirrel								1				
Fox Squirrel												
American Red Squirrel	11	2	1		t	1		4			24	
Northern Flying-Squirrel	1											
American Beaver												
Deer Mouse												t
Muskrat				o		t						
Meadow Vole							1					
Vole Species						t					t	
Mouse Species	t							t				
Norway Rat												
House Mouse												
American Porcupine	1			1		t					t	3
Coyote	1	7	1	t	t	1	1	t	1	t	t	3
Wolf		t									t	
Red Fox	1				t	t		t	t			
Swift Fox												
Black Bear												
Raccoon	t							t				
American Marten												
Fisher											t	
Ermine						t				t		
Long-tailed Weasel						2		t			t	
Least Weasel						t						
Weasel Species	t											
American Mink	t					t		t			t	
American Badger												
Striped Skunk								t				
River Otter											t	
Lynx												
Mule Deer				11			5					
White-tailed Deer	10	7	37	5	t			10	89	t	14	9
Deer Species						t						
Moose	4	t		1				2		t	t	
Elk	70	t									t	
Pronghorn												
Totals seen/heard on count day	101	16	41	18	0	6	8	17	90	0	38	15
Total species seen/heard	10	3	4	4	0	4	4	4	2	0	2	3
Total species recorded by tracks	4	3	0	1	4	9	0	10	2	5	11	2
Total species otherwise recorded	0	0	0	1	0	0	0	0	0	0	0	0
Species recorded count period	0	0	0	0	0	0	0	0	0	0	0	0
Total species count period and day	14	6	4	6	4	13	4	14	4	5	13	5

Table 2. 31st Saskatchewan Christmas Mammal Count-2003.

Species	Codette Lake, 2 Jan 2004	Craven, 14 Dec 2003	Crooked Lake, 4 Jan 2003	Crooked River, 3 Jan 2004	Crystal Lake, 3 Jan 2004	Cypress Hills P.P., 2 Jan 2004	Duck Lake, 23 Dec 2003	Dundurn, 4 Jan 2004	Duval, 28 Dec 2003	Emma Lake, 19 Dec 2003	Endeavour, 20 Dec 2003	Esterhazy-Hazelcliffe, 27 Dec 2003
Shrew Species	t						t					
Nuttall's Cottontail						1						
Snowshoe Hare	t		t				t	t	t	t		t
White-tailed Jack Rabbit		t						t	t			
Richardson's Ground Squirrel												
13-lined Ground Squirrel		1										
Least Chipmunk												
Grey Squirrel		4										
Fox Squirrel		4										
American Red Squirrel	6	4	4	1		4	10			14		1
Northern Flying-Squirrel												
American Beaver		o	o						o			
Deer Mouse		1					t	t				
Muskrat									o			
Meadow Vole			5									
Vole Species	t		t									
Mouse Species									t			
Norway Rat												
House Mouse												
American Porcupine		4	2						o			o
Coyote	2	1	t		1		4	3	t		1	
Wolf	t											
Red Fox	t	2		1					t			
Swift Fox												
Black Bear												
Raccoon												
American Marten												
Fisher	t											
Ermine												
Long-tailed Weasel	t								t	c		
Least Weasel								t	t			
Weasel Species												
American Mink												
American Badger												
Striped Skunk			2						o			
River Otter												
Lynx	t											
Mule Deer		18				14		2	3			
White-tailed Deer	7	19	5	t		27		6	t	t	6	14
Deer Species							t					
Moose	t					2					2	
Elk	t											
Pronghorn												
Totals seen/heard on count day	15	58	18	2	1	48	14	11	3	14	9	15
Total species seen/heard	3	10	5	2	1	5	2	3	1	1	3	2
Total species recorded by tracks	10	1	3	1	0	0	4	4	8	2	0	1
Total species otherwise recorded	0	1	1	0	0	0	0	0	4	0	0	1
Species recorded count period	0	0	0	0	0	0	0	0	0	1	0	0
Total species count period and day	13	12	9	3	1	5	6	7	13	4	3	4

Table 2. 31st Saskatchewan Christmas Mammal Count-2003.

Species	Estevan, 26 Dec 2003	Estuary North, 19 Dec 2003	Fenton, 20 Dec 2003	Fort Qu'Appelle, 15 Dec 2003	Fort Walsh, 20 Dec 2003	Gardiner Dam, 22 Dec 2003	Good Spirit Lake, 16 Dec 2003	Govenlock, 21 Dec 2003	Grasslands, N.P., 22 Dec 2003	Harris, 31 Dec 2003	Holbien, 30 Dec 2003	Hudson Bay, 2 Jan 2004
Shrew Species			t									
Nuttall's Cottontail		4			1	1		6	1			
Snowshoe Hare			t	1	t		t			t		
White-tailed Jack Rabbit		6	t			3	t	t		t		
Richardson's Ground Squirrel								1				
13-lined Ground Squirrel												
Least Chipmunk												
Grey Squirrel												
Fox Squirrel	1											
American Red Squirrel			4	7	13		10				1	3
Northern Flying-Squirrel							2					
American Beaver				c	1							
Deer Mouse			t	1								
Muskrat				1								
Meadow Vole			t									
Vole Species					t		t			t		
Mouse Species												
Norway Rat												
House Mouse				1								
American Porcupine			t	c	4	t	t	1	1	1		
Coyote	1	6	3	1	5	4	t	18	8	1		
Wolf												
Red Fox			1	c			t					
Swift Fox								1				
Black Bear												
Raccoon	1		2	c								
American Marten												
Fisher												
Ermine			t									
Long-tailed Weasel				c								
Least Weasel			t	c								
Weasel Species							t					
American Mink				1			t					
American Badger		t	1		o			o				
Striped Skunk												
River Otter												
Lynx												
Mule Deer	9	53			102	92		210	131	124		
White-tailed Deer	11	27		2	49	56	24		17	20		20
Deer Species			t						58			
Moose					t		1					
Elk					t							37
Pronghorn								64				
Totals seen/heard on count day	23	96	11	15	175	156	37	301	216	146	1	60
Total species seen/heard	5	5	5	8	7	5	4	7	5	4	1	3
Total species recorded by tracks	0	1	9	0	4	1	8	1	0	3	0	0
Total species otherwise recorded	0	0	0	0	1	0	0	1	0	0	0	0
Species recorded count period	0	0	0	6	0	0	0	0	0	0	0	0
Total species count period and day	5	6	14	14	12	6	12	9	5	7	1	3

Table 2. 31st Saskatchewan Christmas Mammal Count-2003.

Species	Indian Head, 26 Dec 2003	Kelvington, 2 Jan 2004	Kenaston, 19 Dec 2003	Kenosee Lake, 3 Jan 2004	Ketchen North, 26 Dec 2003	Kindersley North, 29 Dec 2003	Kinistino, 5 Jan 2004	Kinloch, 15 Dec 2003	Kutawagan Lake, 29 Dec 2003	La Ronge North, 14 Dec 2003	La Ronge South 26 Dec 2003	Last Mountain Lake, 1 Jan 2004
Shrew Species	4							t				
Nuttall's Cottontail												
Snowshoe Hare	3	t		t	t		t	3		c	t	
White-tailed Jack Rabbit	28	t	1									t
Richardson's Ground Squirrel												
13-lined Ground Squirrel												
Least Chipmunk												
Grey Squirrel												
Fox Squirrel												
American Red Squirrel	60	2		4	1		1	4		4	2	t
Northern Flying-Squirrel												
American Beaver	1			o				o			o	
Deer Mouse	2						t					t
Muskrat											o	
Meadow Vole												
Vole Species								t				t
Mouse Species		t										
Norway Rat												
House Mouse												
American Porcupine	4	t	1				2					
Coyote	46	t	2	1			2	t	t		t	t
Wolf								t			t	
Red Fox	20	t	t								t	
Swift Fox												
Black Bear												
Raccoon	3	t	t									
American Marten												
Fisher												
Ermine												
Long-tailed Weasel			t									
Least Weasel								t				
Weasel Species	t						1					
American Mink	5		t									
American Badger		o	t			o						
Striped Skunk	4		t									
River Otter											t	
Lynx											t	
Mule Deer	18		t			6						
White-tailed Deer	202	3	3	26	t			5		3		31
Deer Species									t			
Moose			t	2				t				
Elk				21	t			t				
Pronghorn			t									
Totals seen/heard on count day	400	5	7	54	1	6	6	12	0	7	2	31
Total species seen/heard	14	2	4	5	1	1	4	3	0	2	1	1
Total species recorded by tracks	1	7	9	1	3	0	2	7	2	0	6	5
Total species otherwise recorded	0	1	0	1	0	1	0	1	0	0	2	0
Species recorded count period	0	0	0	0	0	0	0	0	0	1	0	0
Total species count period and day	15	10	13	7	4	2	6	11	2	3	9	6

Table 2. 31st Saskatchewan Christmas Mammal Count-2003.

Species	Leader North, 29 Dec 2003	Love, 28 Dec 2003	Luseland, 26 Dec 2003	MacDowall, 25 Dec 2003	Mayview, 26 Dec 2003	Meadow Lake, 26 Dec 2003	Moose Mountain, 4 Jan 2004	Nipawin, 27 Dec 2003	Nisbet Forest NW, 14 Dec 2003	Nisbet Forest West, 1 Jan 2003	Pike Lake, 4 Jan 2004	Preeceville, 1 Jan 2004
Shrew Species								1				
Nuttall's Cottontail												
Snowshoe Hare				t		t		1	1	c	t	
White-tailed Jack Rabbit	1	2	1	t					t	c	t	
Richardson's Ground Squirrel									t			
13-lined Ground Squirrel												
Least Chipmunk												
Grey Squirrel												
Fox Squirrel												
American Red Squirrel		14		7	1	3	5	4		6	3	
Northern Flying-Squirrel												
American Beaver						o						
Deer Mouse												
Muskrat						o						
Meadow Vole												
Vole Species				t		t						
Mouse Species	2								t		t	
Norway Rat												
House Mouse												
American Porcupine	1	t		t					t		1	
Coyote	4	2	4	t		t	1	3	t	c	o	20
Wolf		t				t						
Red Fox		t	1	t				1			t	1
Swift Fox												
Black Bear									t			
Raccoon												
American Marten												
Fisher		c										
Ermine				t		1						
Long-tailed Weasel				t				2				
Least Weasel	t											
Weasel Species												
American Mink												
American Badger				o								
Striped Skunk												
River Otter												
Lynx				t								
Mule Deer	9		22								11	
White-tailed Deer	18	21	4	6	6	6	3	6	t	2	14	33
Deer Species											9	
Moose		2	4	t								
Elk		t						1				
Pronghorn												
Totals seen/heard on count day	35	41	36	13	7	10	9	19	1	8	38	54
Total species seen/heard	6	5	6	2	2	3	3	8	1	2	4	3
Total species recorded by tracks	1	4	0	10	0	4	0	0	7	0	4	0
Total species otherwise recorded	0	0	0	1	0	2	0	0	0	0	1	0
Species recorded count period	0	1	0	0	0	0	0	0	0	3	0	0
Total species count period and day	7	10	6	13	2	9	3	8	8	5	9	3

Table 2. 31st Saskatchewan Christmas Mammal Count-2003.

Species	Prince Albert, 14 Dec 2003	Prince Albert N.P., 5 Jan 2004	Punnichy, 28 Dec 2003	Qu'Appelle Dam, 14 Dec 2003	Raymore, 25 Dec 2003	Regina, 26 Dec 2003	Roulean, 1 Jan 2004	Round Lake, 20 Dec 2003	Saltcoats, 27 Dec 2003	Sk. Landing P.P., 14 Dec 2003	Sk. River Forks, 29 Dec 2003	Saskatoon, 26 Dec 2003
Shrew Species							t				t	
Nuttall's Cottontail										8		
Snowshoe Hare	t	t	t	t		2		t	1		t	1
White-tailed Jack Rabbit	t					50	t	t	t			3
Richardson's Ground Squirrel												
13-lined Ground Squirrel												
Least Chipmunk												t
Grey Squirrel						6						
Fox Squirrel						12						
American Red Squirrel	19	22				2		8	6		8	5
Northern Flying-Squirrel												
American Beaver						o		o		o		
Deer Mouse						t			1			t
Muskrat				3								
Meadow Vole						t				1		
Vole Species	t	t		t							t	
Mouse Species												
Norway Rat												
House Mouse						t						
American Porcupine	1	t		1		2			1	2	t	2
Coyote	6	t	1	3		4	c	t	t	3	t	2
Wolf		t										
Red Fox		t				10	t	t	1	1		1
Swift Fox												
Black Bear												
Raccoon												1
American Marten		t										
Fisher		t									t	
Ermine												
Long-tailed Weasel								1			t	
Least Weasel						t						
Weasel Species		t										
American Mink						t		t				2
American Badger												
Striped Skunk												
River Otter		5										
Lynx											t	
Mule Deer				54		6		5		37		12
White-tailed Deer	1	3	t	3	2	38		10	1	9	t	32
Deer Species												
Moose										1		
Elk		53								22	t	
Pronghorn										98		
Totals seen/heard on count day	27	83	1	64	2	132	0	24	11	182	8	61
Total species seen/heard	4	4	1	5	1	10	0	4	6	10	1	10
Total species recorded by tracks	3	9	2	2	0	5	3	5	2	0	10	2
Total species otherwise recorded	0	0	0	0	0	1	0	1	0	1	0	0
Species recorded count period	0	0	0	0	0	0	1	0	0	0	0	0
Total species count period and day	7	13	3	7	1	16	4	10	8	11	11	12

Table 2. 31st Saskatchewan Christmas Mammal Count-2003.

Species	Shamrock, 2 Jan 2004	Snowden, 5 Jan 2004	Somme, 5 Jan 2004	Spalding, 26 Dec 2003	Spinney Hill, 26 Dec 2003	Spruce Home, SW, 22 Dec 2003	Squaw Rapids, 4 Jan 2004	Stenen, 1 Jan 2004	Stockholm, 1 Jan 2004	Swift Current, 3jan 2004	Tisdale, 26 Dec 2003	Togo, 4 Jan 2004
Shrew Species				t	t		t	t				
Nuttall's Cottontail										1		
Snowshoe Hare		t		t		t	t	t		9		t
White-tailed Jack Rabbit		3	c		t				2		t	t
Richardson's Ground Squirrel												
13-lined Ground Squirrel												
Least Chipmunk												
Grey Squirrel										3		
Fox Squirrel												
American Red Squirrel		5	1		7	6	9	4				4
Northern Flying-Squirrel												
American Beaver												
Deer Mouse		t								t		
Muskrat												
Meadow Vole			2	t								
Vole Species												
Mouse Species												
Norway Rat												
House Mouse	t							t	1			
American Porcupine		1						t		1		1
Coyote	2	t	2	t	3	2	3		1	1		t
Wolf			1				t					
Red Fox	t			t		t		t	1			
Swift Fox												
Black Bear												
Raccoon		1						t				
American Marten												
Fisher			1									
Ermine								t	1			
Long-tailed Weasel			c			t		t				
Least Weasel												
Weasel Species										1		
American Mink												
American Badger												
Striped Skunk												
River Otter												
Lynx						t						
Mule Deer	51									53		
White-tailed Deer	8	2	41	t		t	6	8	2	121	t	4
Deer Species												
Moose			3	t			1					
Elk			c				t					
Pronghorn												
Totals seen/heard on count day	61	12	51	0	10	8	19	12	8	190	0	9
Total species seen/heard	3	5	7	0	2	2	4	2	6	8	0	3
Total species recorded by tracks	2	3	0	7	2	5	4	8	0	1	2	3
Total species otherwise recorded	0	0	0	0	0	0	0	0	0	0	0	0
Species recorded count period	0	0	3	0	0	0	0	0	0	0	0	0
Total species count period and day	5	8	10	7	4	7	8	10	6	9	2	6

Table 2. 31st Saskatchewan Christmas Mammal Count-2003.

Species	Torch River Valley, 4 Jan 2004	Turtleford, 29 Dec 2003	Turtle Lake, 31 Dec 2003	Weyburn, 18 Dec 2003	White Bear, 28 Dec 2003	Whitewood, 28 Dec 2003	Yorkton, 30 Dec 2003	Totals seen/heard on count day	# Counts seen/heard	# Counts recorded by tracks	# Counts otherwise recorded	# Counts count period	# of Counts count period & day
Shrew Species								5	2	12	0	0	14
Nuttall's Cottontail					1			24	9	0	0	0	9
Snowshoe Hare	3	t				2	t	29	12	37	0	2	51
White-tailed Jack Rabbit				1	4	t	t	109	16	23	0	2	41
Richardson's Ground Squirrel								1	1	1	0	0	2
13-lined Ground Squirrel								1	1	0	0	0	1
Least Chipmunk								1	1	1	0	0	2
Grey Squirrel				5			1	20	6	0	0	0	6
Fox Squirrel						1		18	4	0	0	0	4
American Red Squirrel	5	3	2			2		364	54	2	0	0	56
Northern Flying-Squirrel								3	2	0	0	0	2
American Beaver		o				o		2	2	0	12	1	15
Deer Mouse		1						6	5	10	0	0	15
Muskrat			2			o		6	3	1	5	0	9
Meadow Vole						t		9	4	4	0	0	8
Vole Species		t						0	0	16	0	0	16
Mouse Species								2	1	6	0	0	7
Norway Rat						t		0	0	1	0	0	1
House Mouse						t		2	2	4	0	0	6
American Porcupine					c	5	t	44	24	13	2	2	41
Coyote		1		1	2		t	196	48	24	1	2	75
Wolf								1	1	9	0	0	10
Red Fox		3		1			1	47	16	20	0	1	37
Swift Fox								1	1	0	0	0	1
Black Bear								0	0	1	0	0	1
Raccoon						2		10	6	5	0	1	12
American Marten								0	0	1	0	0	1
Fisher								1	1	4	0	1	6
Ermine						t		2	2	6	0	0	8
Long-tailed Weasel								5	3	9	0	3	15
Least Weasel	1	1						2	2	7	0	1	10
Weasel Species								2	2	4	0	0	6
American Mink								8	3	8	0	0	11
American Badger						o	o	1	1	2	7	0	10
Striped Skunk		o						6	2	2	2	0	6
River Otter								5	1	2	0	0	3
Lynx								0	0	5	0	0	5
Mule Deer		t	15	49	77			1199	28	2	0	0	30
White-tailed Deer	6	t	30	35		2	3	1250	64	13	0	0	77
Deer Species								67	2	4	0	0	6
Moose	c	t	1			t		26	13	11	0	1	25
Elk	c							204	6	9	0	2	17
Pronghorn								162	2	1	0	0	3
Totals seen/heard on count day	15	9	50	92	84	14	5	3841					
Total species seen/heard	4	5	5	6	4	6	3		35				
Total species recorded by tracks	0	5	0	0	0	6	4			32			
Total species otherwise recorded	0	2	0	0	0	3	1				6		
Species recorded count period	2	0	0	0	1	0	0					12	
Total species count period and day	6	12	5	6	5	15	8						39

Table 3. Summary of Saskatchewan Christmas Mammal Counts-1973-2003.

Year	**Counts**	**Species by category***					**New Species**
		s	**t**	**o**	**c**	**Total**	
1973	8	8	3	0	0	**11**	Snowshoe Hare, White-tailed Jack Rabbit, Grey Squirrel, Am. Red Squirrel, Am. Porcupine, Coyote, Red Fox, White-tailed Deer.
1974	16	12	2	0	1	**15**	Am. Beaver, Deer Mouse, Meadow Vole, Mule Deer.
1975	28	14	6	0	1	**21**	Franklin's Gr. Squirrel, Muskrat, House Mouse, Long-tailed Weasel.
1976	33	14	8	0	1	**23**	Nuttall's Cottontail, Moose, Elk, Pronghorn.
1977	41	13	6	2	3	**24**	Least Weasel, Am. Badger.
1978	42	20	6	0	3	**29**	Raccoon, American Mink, Bobcat.
1979	42	23	3	0	1	**27**	Wolf, Striped Skunk.
1980	45	22	4	0	2	**28**	Richardson's Gr. Squirrel, Fox Squirrel, Ermine.
1981	37	20	4	1	2	**27**	
1982	49	22	3	2	1	**28**	Northern Flying-Squirrel.
1983	55	25	5	1	1	**32**	
1984	54	25	7	2	0	**34**	Gapper's Red-Backed Vole, Fisher.
1985	62	27	3	0	2	**32**	River Otter.
1986	66	30	4	0	3	**37**	Pygmy Shrew, Norway Rat, Am. Marten.
1987	70	28	3	1	5	**37**	Masked Shrew, Eastern Cottontail.
1988	68	28	1	2	5	**36**	Woodchuck, Woodland Caribou.
1989	68	29	0	1	3	**33**	(Little Brown Bat-dead, count period).
1990	65	28	5	2	3	**38**	Northern Pocket Gopher, (Big Brown Bat-dead, count period).
1991	82	33	4	2	3	**42**	Short-tailed Shrew, Black-Tailed Prairie Dog, (Sagebrush Vole-dead).
1992	69	22	8	1	5	**36**	(Am. Water Shrew-count period).
1993	72	27	5	2	2	**36**	
1994	84	32	7	0	1	**40**	(Mountain Lion-tracks).
1995	78	33	4	0	1	**38**	Swift Fox.
1996	82	29	3	1	4	**37**	Black Bear, Lynx.
1997	96	32	4	0	3	**39**	
1998	87	27	7	3	1	**38**	
1999	94	30	3	0	3	**36**	
2000	93	30	2	1	5	**38**	
2001	102	32	5	0	5	**42**	
2002	93	33	4	0	1	**38**	(jumping mouse species-tracks).
2003	91	35	4	0	0	**39**	13-lined Gr. Squirrel, L. Chipmunk.
Totals	**1972**	**49**	**2**	**0**	**4**	**55**	

s = seen, t = identified by tracks, o = identified by other methods (see introduction), c = recorded during count period but not on count day.

Swift Fox photographed on 21 December 2003 during the Christmas Mammal Count at Govenlock. ***Val Harris***

American Red Squirrel in winter. ***Larry A. Morgotch***

MAMMALS OF WAPUSK NATIONAL PARK : Survey Results and a Provisional Checklist

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In 1997, staff of the Manitoba Museum and the newly created Wapusk National Park began planning a small mammal inventory of the park. The rationale was straightforward - to manage the park, Wapusk staff need to know what is out there. Fieldwork started in 1998 and continued through the following three field seasons with the primary objective of producing a credible list of the mammals of Wapusk. A secondary objective was to provide the Museum with voucher specimens of several species from known locations to demonstrate habitat affiliations within the park.

During fieldwork, larger species were observed opportunistically, along with their tracks and signs. Seasonal Park Officer Jack Batstone of Churchill MB was interviewed in 1998 regarding local medium and large mammal species because of his extensive experience in the area as a trapper, hunter and resident. Fur records for 1996 - 2000 for the registered trap lines within the park were obtained from Manitoba Department of Conservation (D. Berezanski, pers. comm.). Some conversations were held with York Landing First Nation people about their traditional knowledge of mammal species in the area, but more work is needed in this area to get a complete picture.

The habitats in the Park and nearby region provide unique and significant contributions to the biodiversity of Manitoba and Canada.[7] Among the unique features, as examples, are the largest Polar Bear denning area in the world; the only North American Ross' Gull nesting area; large nesting concentrations of Canada and snow geese; an intersection of the range of plant and animal species from the north, south, east and west; and two unique caribou herds. This area has been proposed for both an Important Bird Areas site and Western Hemisphere Shorebird Network site.

Although a wide variety of biological investigations have occurred and continue at Churchill, only a few species – e.g. Lesser Snow Geese, Canada Geese, and Polar Bears – have been studied extensively in the area that is now Wapusk National Park.[6,11,13,20] Only a few studies investigated other mammalian fauna.[1,4,8,10] Earlier small mammal inventory work was done in the vicinity of Churchill and at the mouth of the Seal River by museum field parties, using the same methods, in the early 1970s.[23] Subsequent to that, museum staff collected small mammals at York Factory in 1975 and at the mouth of Opoyastin Creek in 1982.

During this study, the following sites were sampled for small mammals: near the mouth of the Broad River, 58° 08'N, 92° 51'W, (22-26 July 1998); along the length of the Owl River within Wapusk National Park (10-20 June 1999); near the mouth of the Owl River, 57°51'N, 92°45'W, (21-27 July 1999; June 27-July 1 2000; 3-7 August 2001); Hannah Lake, 58°22'N, 93°26'W, (29 June-1July 2001); Brown Lake vicinity, 58°24'N, 93°33'W, (1-3 July 2001) (Fig. 1).

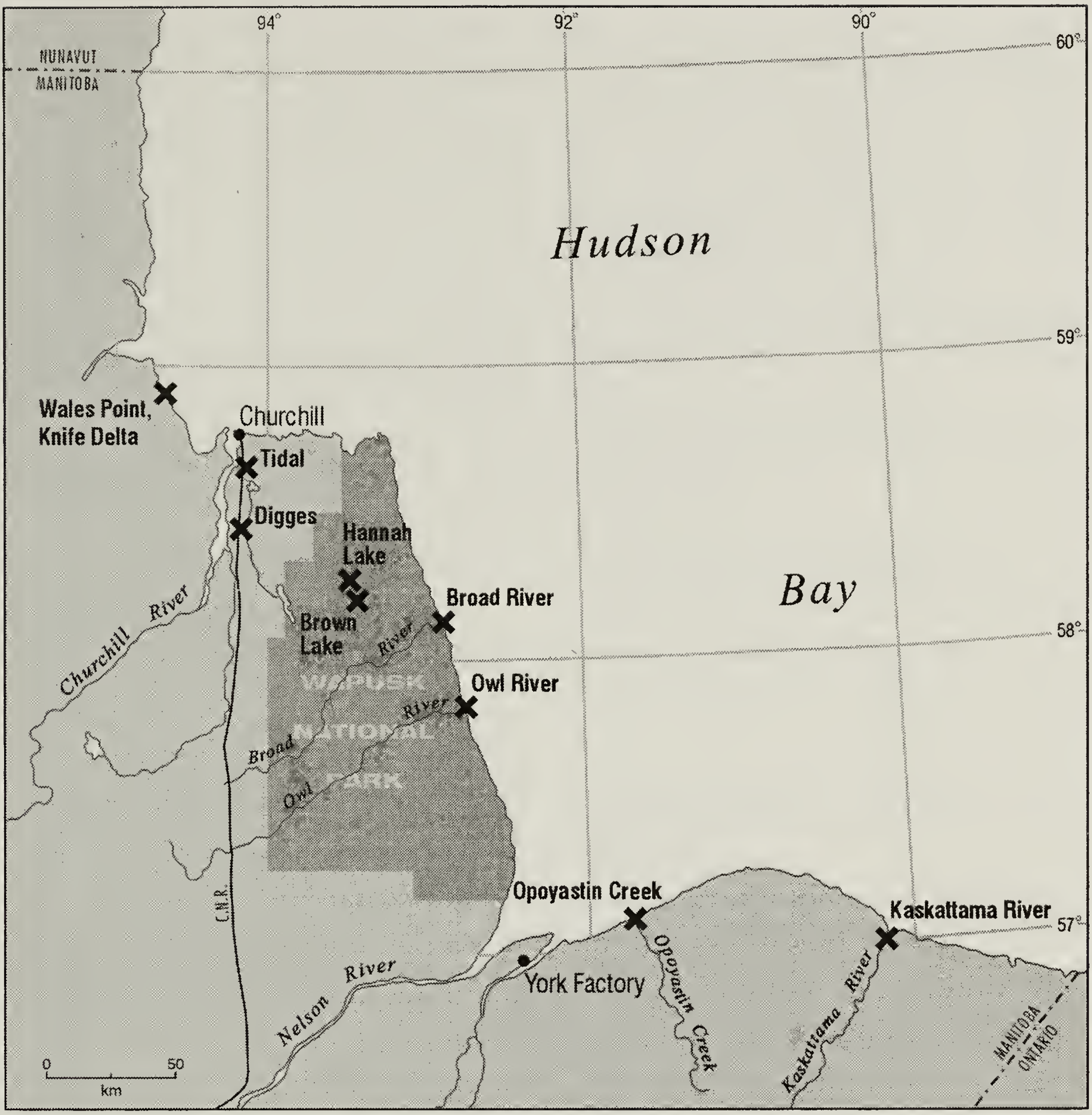

Figure 1. Locations at which surveys for mammals were conducted in the area of Wapusk National Park

Local habitats were sampled using Museum Special® traps, under Parks Canada research permits to the senior author. Sites included all representative habitats readily accessible within the time available. Immediately along the coast, such habitats include small, patchy beach meadows; sedge-meadows; lichen-heath tundra along water bodies in inter-beach ridge swales, i.e., pond margins, shrubby pond, river and creek margins. During the Owl River traverse from the Hudson Bay rail line to the bay itself, some sampling was done in treed areas within 250 m of the shoreline. Along the Owl River and at its estuary, Richardson's Collared Lemming was particularly sought after, so its preferred habitat of dry lichen-heath tundra was disproportionately sampled.[18] Exact locations of all trap lines were recorded in UTM co-ordinates by hand-held Global Positioning System (GPS) units. These data have been entered into the Wapusk Geographic Information System, housed in the Prairie and Northern Region, Parks Canada offices in Winnipeg, to link each species with the vegetation map of the Park (Brook 2001).[5] All suitable mammal specimens collected were prepared in the field as study skins and skulls, and then deposited in the collection of the Manitoba Museum.

Results

In total, 13 species were captured. Twelve additional species were observed. Weather, drought and time of year influenced trap success. Capture rates during this study straddled high (1999), crash (2000) and recovery (2001) years in the population cycle of small mammals of the region. This highlights the challenge of working with small mammals and the value of long-term monitoring in areas such as the Hudson Bay coastal region in the face of the well-known biological cycles.[19] All species at these latitudes have only one litter per year, so the later in summer that collecting occurs, the larger the population of small mammals to sample from. Most of the females captured during this study were pregnant, in oestrus or had given birth recently. Few young of the year were taken.

The Richardson's Collared Lemmings taken at the Owl River are 100 km south of the closest recorded occurrence, and thus represent a southern range extension for this species.[1, 16] Elders of the York Landing First Nation say that the collared lemmings, referred to as "polar bear lemmings" because their fur turns white in the winter, were found even further south at one time (Flora Beardy, pers. comm). The coastal region, from Wapusk National Park to the Ontario border, was part of the First Nation's traditional use area for many generations.[3] An examination of the vegetation classification map indicates that there may well be suitable habitat for collared lemming in Wapusk National Park south of those locations reported here.[5] Further fieldwork is needed.

A survey of the literature,[2, 9] discussions with a local trapper, examination of trap line returns, and this study revealed that there are at least 41 mammal species inhabiting Wapusk National Park and adjacent waters, and 12 additional hypothetical species (see Check List, below). Only two species have been locally extirpated since Europeans first came to the region more than 300 years ago – the tundra grizzly and the Muskox, although one grizzly was seen in the Broad River area in 1998 (D. Clarke, pers. comm) and in 2003 (D. Hedman, pers. comm). The last wild Muskoxen reported in Manitoba were two individuals seen in the area of Wapusk National Park in the summer of 1897.[14] Bowhead Whales reappeared in the Churchill River mouth vicinity recently, after an absence of about a century,[21] and were seen as recently as August 2002 (C. Elliott, pers. comm). Minke Whales were seen in Button Bay in 1991, but have not been seen since.[12]

If global climate change occurs as predicted, the flora and fauna of the Hudson Bay coastal region may exhibit "rapid" changes in distribution, given that several species are at or near range limits now.[15] The range of Arctic species, such as Polar Bear,[20] lemming and Arctic Hare, would shrink northward, with those of southern species, like Deer Mouse, White-tailed Deer and Striped Skunk expanding northward behind them. Given the well-known role of the latter three species as vectors of a variety of diseases, their range expansion could exacerbate negative climate change impacts on northern ecosystems.[22] Periodic monitoring of mammal distribution should be part of any regional climate- change monitoring program.

Acknowledgements

On behalf of the Museum team we would like to thank Parks Canada for financial and logistical support and the staff of the Churchill Northern Studies Centre for their excellent logistical support. Manitoba Conservation, Manitoba Hydro and Environment Canada, through the Habitat Stewardship Program, also supported fieldwork in the last three years. We thank Wapusk National Park for lending us various equipment over the years, as well providing accompanying park officers. Staff of Hudson Bay Helicopters always gave excellent, friendly service. Many thanks to Janis Klapecki and volunteer David Wright for their invaluable assistance. Thanks to Elizabeth Punter, Jack Batstone, Greg Lundie, Ryan Brook, Evan Richardson and Joerg Tews for their cheerful company and support in the field.

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PROVISIONAL CHECKLIST OF THE MAMMALS OF WAPUSK NATIONAL PARK

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Comments made in 1998 on mammals seen or trapped in Wapusk National Park over many years by Jack Batstone of Churchill, MB are indicated by [square brackets]. Asterisks indicate species observed (*) and trapped (**) during 1999-2001 surveys. Additional 1998-2001 survey observations are in (curved brackets)

Soricidae Shrews

*Sorex arcticus***	Arctic Shrew
Sorex cinereus **	Masked Shrew
Sorex hoyi **	Pygmy Shrew
Sorex palustris	Water Shrew

Leporidae Rabbits and Hares

Lepus americanus	Snowshoe Hare
Lepus arcticus	Arctic Hare

[Present in the Park. Salmon Creek is the farthest south he has seen them. "Lots of droppings around Nester 1 (goose research camp at Cape Churchill). Lots around Churchill now."]

Sciuridae Squirrels

*Tamias minimus***	Least Chipmunk
Marmota monax	Woodchuck
*Tamiasciurus hudsonicus***	Red Squirrel
Glaucomys sabrinus	Northern Flying Squirrel

Castoridae Beavers

Castor canadensis	Beaver

[Present, but not common. Some beaver lodges currently present at Norton Lake.]
(several seen but no lodges, along Owl River 1999)

Muridae Rats, Mice, and Voles

*Clethrionomys gapperi***	Southern Red-backed Vole
*Dicrostonyx richardsoni***	Richardson's Collared Lemming
*Microtus pennsylvanicus***	Meadow Vole
Ondatra zibethicus	Muskrat

[Present inland from the coast, but not in large numbers.]

*Phenacomys intermedius***	Heather Vole
*Synaptomys borealis***	Northern Bog Lemming

Dipodidae Jumping Mice

*Zapus hudsonius***	Meadow Jumping Mouse

Erethizontidae New World Porcupines

Erethizon dorsatum	Common Porcupine

[Present. "Some here, up the creeks."]

Canidae Dogs

Canis lupus Gray Wolf

[Present. Common in the Park.] (tracks seen, fresh caribou kill overnight, pack heard and one seen at mouth of Owl River, 2001, one den found at Hannah Lake 2001)

*Alopex lagopus*** Arctic Fox

[Present. "Have seen lots - at least as far south as Cape Tatnum."] (two seen inland, along Owl River, several den complexes)

Vulpes vulpes Red Fox

[Present. "All over Wapusk."] (a few seen, sign common in treed areas)

Ursidae Bears

Ursus americanus Black Bear

[Present in the Park, but not too many. Higher numbers are found along the Churchill River.] (sign near junction of Silcox River & Owl, 1999)

*Ursus maritimus** Polar Bear

(several individuals seen along coast and on flights to and from Churchill to field camps, all years)

Phocidae Hair Seals

Erignathus barbatus Bearded Seal

Phoca vitulina Harbour Seal

(one individual, seen 50 km inland in the Owl River, 1999)

Phoca groenlandica Harp Seal

(occasional)

Phoca hispida Ringed Seal

Mustelidae Weasels

Martes americana American Marten

[Present, along the rivers.]

Martes pennanti Fisher

[Present, along the rivers.]

M*ustela erminea* Ermine

[Present, all over the Park.]

*Mustela nivalis*** Least Weasel

Mustela vison Mink

[Present, along the rivers.]

Gulo gulo Wolverine

[Commonly present. "Trapped one at Salmon Creek last year."] (one seen west of Broad River cabin ~1 km W, 1998)

Lutra canadensis Northern River Otter

[Present, along the rivers.] (five seen on Owl River 1999)

Felidae Cats

Lynx canadensis Lynx

[Present, when hare numbers are high.]

Balaenidae Bowhead Whales

Balaena mysticetus Bowhead Whale

(occasional)

Monodontidae White Whale and Narwhal

Delphinapterus leucas	Beluga

Cervidae Deer

Alces alces	Moose

[Present but not as numerous as further south along the Hayes and Churchill rivers.] (one seen inland, along Owl River, a few on flights from camps in Park to Churchill)

Rangifer caribou	Caribou

(hundreds seen on flights to Churchill from field camps all years; current estimated population 3013, minimum)

Hypothetical Species:

Lasiurus borealis	Eastern Red Bat
Lemmus sibiricus	Brown Lemming
Microtus xanthognathus	Yellow-cheeked Vole
Peromyscus maniculatus	Deer Mouse
Marmota monax	Woodchuck

[Not in Park. Closest seen was at Port Nelson.]

Mephitis mephitis	Striped Skunk

[Not present. One was seen at Cape Tatnum (Opoyastin Creek mouth) goose camp a few years ago.]

Canis latrans	Coyote

[Not present. His father trapped one up the Seal River once but he has never seen one in this area.]

Ursus arctos	Grizzly Bear

(occasional) [Present in the Park in June 1998. Single individual seen off and on for the last few years in the Park.]

Odobenus rosmarus	Walrus
Balaenoptera acutorostrata	Minke Whale
Odocoileus virginianus	White-tailed Deer

[Not present. There is a local story of three animals over-wintering on Poplar Island in the Hayes River near York Factory.]

Ovibos moschatus	Musk Ox

(currently extirpated in the area)

Northern Flying Squirrel.

Chuck Priestley

NOTES AND LETTERS

CEDAR WAXWINGS EAT APPLE BLOSSOMS

In the Spring of 2003 I received a phone call from Lorraine Hovdebo in Birch Hills, SK, asking me why the Cedar Waxwings were feeding on her apple blossoms. Not having seen or heard of this behavior before, we both agreed that it was likely an isolated happening and that, though interesting, was not a type of behavior that would be repeated. However, this past May I received another phone call from the same person stating that the waxwings were back in her tree eating her flowers.

Still somewhat sceptical, I decided to go see for myself, but then I spotted some waxwings flitting around in an apple tree in our own orchard. I walked over and found that what I thought were ‘a few’ actually became 33 of the dapper birds feeding on the flowers of one tree. I approached to within a few metres and observed them as they picked at the blossoms and ingested the various parts.

After a few minutes, I went up to the tree only to find that the birds were very reluctant to leave, merely flying higher into the branches where they watched from a metre or so away as I examined where they’d been eating. From most of the flowers, only the petals had been stripped away, but from some the stamens and pistils also had been removed.

Finding all this so unusual, I sent an e-mail query out into the birding community and received several responses. Don Weidl wrote, “When I was a young boy in Broadview, our neighbour, in the springtime, often used to shoot the Cedar Waxwings that were in his fruit trees. The old man claimed that the birds were eating his fruit.” Becky Whittam of Bird Studies Canada wrote, “Early in the spring and summer, before fruit is available, flowers would appear to be a prime source of food.” Stuart Houston found a good deal of material describing this feeding behaviour. Witmer and co-authors give the results of the analysis of stomach contents which answers questions about the eating of flowers by this bird: “Diet analysis from the E U.S. (primarily the NE U.S.) over 65 years showed that fruit constitutes 84% of annual diet, flower parts 4%, and insect prey 12%; eats flowers for brief periods in spring (44% of diet in May...), a time of year when fruit supplies are low.”[1] Thus, it appears that what is unusual waxwing behaviour in our area is actually quite common elsewhere, including in Regina, where Bob Luterbach wrote in an e-mail to Stuart Houston, “I have seen this behaviour many times both within Regina parks and within my yard at Tyvan.”

It may be of interest that fruit production in our orchard does not appear to have been harmed.

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DOWN TO EARTH - AN ALASKAN EAGLE IS TRACKED DOWN IN SASKATCHEWAN

On 26 December, 2000, I received a call about a Golden Eagle found dead west of Leader, Saskatchewan, along the South Saskatchewan River. As a Conservation Officer with Saskatchewan Environment (SE), I went out to retrieve the bird, and found that it had a radio transmitter affixed to its back, as well as an official leg band. There were no markings or any identification on the transmitter to indicate who had originally captured the bird. I called a few SE employees, but no one knew of a possible origin for a radio-carrying eagle. I called the bird banding headquarters in Washington, DC; they said it would take several weeks to identify and contact the bander. I placed the bird in the SE freezer, and on 3 January 2001, I took the bird to a local taxidermist to have it skinned and the carcass sent to the Western College of Veterinary Medicine at the University of Saskatchewan to determine the cause of death.

On 8 January, I received a telephone call from Carol McIntyre, a biologist in Alaska. She was requesting my help to locate a missing eagle carrying a radio transmitter! When I told her that I had her eagle, she was amazed. It turned out that the transmitter signal encoded both location and temperature. The transmitter was set to broadcast a signal only once every three days, to extend the life of the battery. Carol McIntyre had received a signal on or about 24 December, but while the bird was in the freezer, signal transmission apparently was blocked. The transmitter was removed from the freezer and from the bird at the taxidermist's, and on 4 January, Carol McIntyre began receiving signals again. She was able to pinpoint the bird's location to a 100 x 30 m area in Leader SK. In addition, she knew something was wrong because the temperature signal indicated +19C. She was sure it could not be that warm in Saskatchewan in January!

Carol McIntyre told me that the eagle had been banded and affixed with the transmitter as a juvenile in August 1999 southwest of Fairbanks, Alaska, in Denali National Park. During the winter of 1999-2000, it had migrated to the area west of Leader, near the community of Estuary along the South Saskatchewan River. In summer 2000, the bird returned to the Denali National Park area. It spent part of that fall around Edmonton before arriving at Estuary in mid-December 2000.

The veterinary pathologist reported that the bird had died of starvation. Over the previous three years, Carol McIntyre had banded and tracked 47 golden eagles. In her study, nearly 70% of the juvenile birds did not survive to the end of their first year. The primary causes of death were starvation and electrocution. Two birds had been killed illegally, both in Alberta. This was the first of her marked eagles to die of starvation during its second year.

I asked Carol McIntyre how she came to telephone me in the Leader office. She said that after she had determined Leader was the SE office closest to the bird's radio signal, she had found my name and number on the SE web page. It was only coincidence that I had already picked up the bird. The radio transmitter was returned to Carol McIntyre for future work.

Kerry Wrishko, Box 70, Leader, SK S0N 1H0.
E-mail: <wrishko.family@sasktel.net>

AN IMPRESSIVE LADY

Almost daily, for the past nine years, I have taken our Brittany spaniel for a run in a small park just three blocks from our home in SW Winnipeg. A small man-made retention pond adjacent to the parking lot in the park has always been a good place to look for birds. Over the years this shallow catch-basin has developed – all quite naturally – into an attractive cattail marsh. For the past several years it has supported a small colony of Red-winged Blackbirds. In spring 2003, I began feeding these birds, sprinkling mixed birdseed on top of adjacent large-diameter fence posts as well as on the nearby pavement. This was not so much for their sake as it was for mine, to bring them up close and thus to better enjoy their colour and behaviour. This worked, and soon the Redwings, as well as a few Yellow-headed Blackbirds from a nearby deeper marsh, were enjoying my almost daily provision of food.

Thus, I soon discovered that a resident female redwing was missing a foot, her entire left foot somehow having been severed distal to the tarsal or "ankle" joint (Fig 1). Even on a windy day, despite this obvious handicap, the bird seemed completely at ease balancing on her right foot, though occasionally resting on her abdomen. I was able to show this bird to several people during the summer. Judging by her constancy and aggressive behaviour towards other female redwings, as well as the attentive behaviour of one of the males, I assumed that she was nesting in the little marsh.

Inspired by this observation, I wrote a poem about the bird (see poetry section). A year later, in spring 2004, I was astonished and pleased to find that this bird had survived and returned to her breeding site for a second season. I enlisted the help of local birder and photographer Christian Artuso, who kindly captured the image and spirit of this indefatigable and adaptable bird. I can't imagine how she has managed to cling to vertical cattail stalks with only one foot while constructing a nest. I presume that she has done this at least twice, nest-building in redwings solely being the role of the female. This matter requires further observation!

Robert Nero, 546 Coventry Road,
Winnipeg, MB R3R 1B6

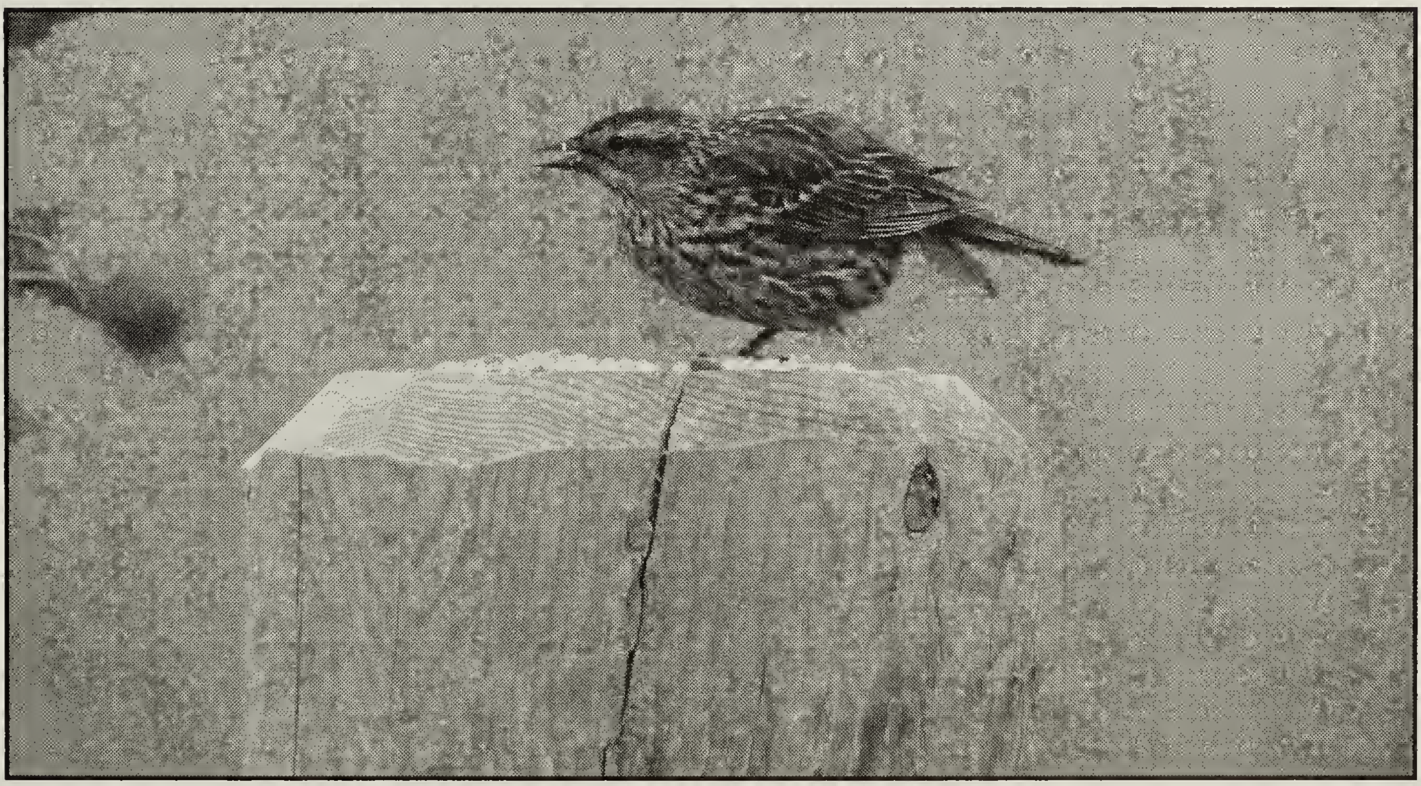


Figure 1. Female Red-winged Blackbird with only one leg. ***Christian Artuso***

POETRY

MISSING A FOOT

Indomitable, persevering, amazing, I thought,
watching a female Redwing with only one foot
struggling in the wind to keep her balance
on top of a fence-post beside a small marsh.
Daily I park there to run the dog in the nearby meadow
regularly sprinkling birdseed on top fence-posts
bringing Red-winged Blackbirds up close
to admire their familiar color and behavior.
But a bird with only one foot?! To cling to
cattail stalks, to forage, to crouch beneath
a mate, to all by herself... build a nest?!
I couldn’t have imagined the possibility
until I saw her up close, dexterously balancing
on her one good foot despite the tearing wind,
the bird’s spirit relentlessly compelling it onwards.
The next day, in mid-afternoon, a really hot and windy day,
when I stopped the car to let the dog go to the pond
to drink, my one-footed friend came flying up out
of the cattails and over to where I stood
but, alas, I hadn’t brought any birdseed...
she crouched down on a nearby post in the fierce wind
then flew up to challenge a second female
the two of them dueling overhead then flying down
to perch on cattails where they continued to bicker
despite my dog swimming nearby... I thought:
“I love you! I love your spirit!” But, in retrospect,
the wonder is perhaps less in the adaptability
of the bird than in my joyful response.

- *Robert Nero*

NATURE LIBRARY

HOME PLACE: ESSAYS ON ECOLOGY

J. STAN ROWE. 2002. NeWest Press, Edmonton. ISBN 1-8963-0053-7. Paper $24.95

Lyrical ecology. Admirers of veteran Canadian ecologist Stan Rowe's 1990 volume of reflective essays on human ecology called *Home Place* will welcome a new revised edition from NeWest Press. Rowe spent several decades at the University of Saskatchewan in Saskatoon as a plant ecologist in what was then called field husbandry. The Western Canadian prairie sings through this volume, but so does a multivoiced lyrical awareness of our humble place in the larger and more profound realm of Earth. Rowe wants us to learn how to gaze outwards from our human condition, to consider "the theme of Earth as the life-giving, life-sustaining milieu of people."

The essays talk about place, western history, the rightful nature of human relationships to nature and land, the rights of nature, environmental dangers, significant voyages, environmental ethics, and the choices facing human endeavours such as agriculture. The essays are permeated by a reflective serenity, a measured sense of what matters most and how best to communicate important ideas to others. Those looking for both philosophical and pragmatic advice can find it here. Rowe is now in his 80s and this gracious collection beautifully reflects a lifetime of productive thought.

I have a small corner on a bookshelf where I put the dozen or so favourite books that I like to take out at those odd times of weariness or loneliness, when the soul needs a tune-up or massage. *Home Place* is there, with its measured whispers of wisdom, right next to *The Gypsies*, Jan Yoors' poignant memoir of running off with the travelling folk as a young boy, and Tim Lilburn's evocative poems in *The Moose Woods Sandhills* that resulted from several years of isolation in the dune lands on the Saskatchewan River.

I'm sure you will find these essays as nourishing as I did. Royalties from the book will help keep the Canadian Parks and Wilderness Society from going hungry too.

Greg Michalenko, University of Waterloo, Waterloo, ON N2L 3G1 E-mail: <gcmichal@fes.uwaterloo.ca>

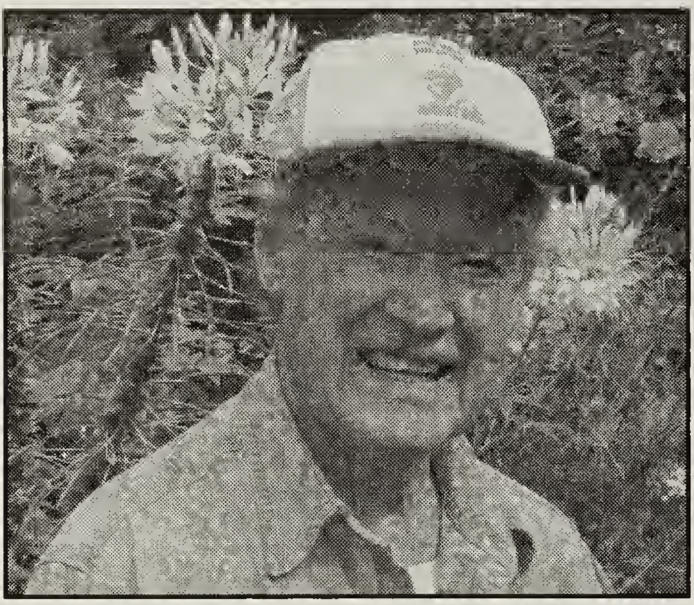
[Reprinted, with permission, from *Alternatives Journal* 30:2 (2004). Greg Michalenko is this journal's reviews editor. Annual subscriptions to *Alternatives Journal* are $35.00 (plus GST). Contact the journal at <www.alternativesjournal.ca>.]

> "Earth-as-home is not a self-evident percept. Few pause daily to consider with a sense of wonder the enveloping matrix from which we came and to which, at the end, we all return. Because we are issue of the Earth, the harmonies of its lands, seas, skies and its countless beautiful organisms carry rich meanings barely understood."
>
> Ted Mosquin and Stan Rowe. A Manifesto for Earth. *Biodiversity* Vol 5(1): 3-9. 2004

IN MEMORIAM

MEMORIES OF STAN ROWE

DON GAYTON, 23 Robson St., Nelson BC V1L 5A9, E-mail: *<d.gayton@netidea.com>*



Stan Rowe in 2003 ***P. Jonker***

My connections with Stan Rowe (1918-2004) amount to a couple of momentary flickers in the course of his long and illustrious life, but those brief encounters were significant. Perhaps that is one measure of greatness; the ability to make even small moments seem large.

I first met Stan in 1975, when I was a new and lowly graduate student in the University of Saskatchewan's Department of Plant Ecology. He was not my major professor, but I turned to him often for advice. His quiet presence was reassuring as I stumbled about, learning the ropes of a new role, a new discipline, and a new country. At first, "Ecology" was just a vague buzzword to me, but in my chats with Stan, I grew to see the profound meaning and importance of the term.

My own Master's thesis was a tortuous project on the grazing response of certain native grasses. In the course of defining the research problem, setting up hypotheses, testing them, rejecting false positives and experiencing the buzzing complexity of natural systems, I learned a great deal about the scientific process. That learning came to be the major outcome of the thesis project. As I wrote up the thesis, I happened to be reading Bertolt Brecht's wonderful play, *Galileo*. In the play, the character Galileo has brilliant literary insights on the scientific process, so I put a quote from the play as a frontispiece to the thesis:

"Perhaps they are clouds, perhaps they are sunspots, but before we assume they are sunspots, which would be most opportune for us, let us rather assume they are fishes' tails. Yes, we will question everything, and everything once again. And, we shall advance not in seven-league boots, but at a snail's pace. And what we find today we shall strike from the record tomorrow, and only write it again when we have once more discovered it. And what we wish to find, if we find it, we shall regard with especial distrust...."

When it came time for my thesis defence, seven distinguished professors, one after another, passed judgment on the Brecht quote, demanding that it be removed, saying a piece of literature had no place in a scientific document. I felt like a heretic at the Inquisition. Stan happened to be the last, eighth professor to pass judgment, and all eyes turned to him. Stan said three words, which I shall forever remember, and be forever grateful for. "The quote stays," he said, quietly. There was no further discussion; the quotation was accepted and we moved on to other issues.

Stan had not only defended my right to idiosyncrasy; he had also lent support to my pathetic attempt to marry science and the arts, a theme that loomed large in Stan Rowe's own life.

There was much that I didn't learn about Stan in those early days, but we picked up the threads of friendship again many years later, when Stan moved to New Denver, British Columbia, and I was living in nearby Nelson. The story of his connection to New Denver slowly unfolded: conscientious objector during World War II, sent to teach high school in the Japanese internment camp in New Denver, returning to live in that isolated mountain town after his retirement. I had been a conscientious objector during the Vietnam War (a far less daunting stance), so this provided a mostly unspoken bond between us.

Periodically I would pass through New Denver and stop at the cozy little Rowe house on Josephine Street for a chat. Canada's foremost ecologist, he was mostly content to stay home, out of the limelight. Once I convinced him to give a talk at an annual Botany BC conference ("Botany" in this case was an acronym, standing for "botanical organization to achieve nothing yearly"). When he asked me what topic he should speak on, I said the field was open: boreal forest ecology, park management, environmental conservation—he could choose from any of his many fields of expertise. When he rose to speak at the conference, his topic surprised us all: it was an impassioned plea for more women in the fields of natural resource management and ecology.

Another time, I convinced him to give a reading with me in Nelson. I read a few snatches from *The Wheatgrass Mechanism*,[1] but the main attraction was Stan, who read from his fine work, *Home Place*.[2] At one point in Stan's reading the text referred to singing, and to illustrate the point, Stan sang a lovely Irish ballad, *a capella*. He was right on key, and the audience loved it.

Writing was a big part of Stan's later years, and he focused on ecological theory. He was one of the early voices urging for ecosystem management on a landscape scale, long before it came into vogue. And he extended the Gaia theory, critiquing our obsession with living organisms. In a well-known paper, *What on Earth is Life?*, Stan argued convincingly that the spark of life lies not in the organism, the cell or the nucleus, but rather in the physical environment that sustains the organism.[3]

Stan was active in a local New Denver writing club. A club member shared with me one of Stan's Haiku poems that demonstrated Stan's sly and delightful humor:

A bear on the trail!
The philosopher runs
Just like everyone else.

In rereading one of Stan's papers recently, I ran across this resonant phrase: "the landscape as an object of moral concern." That sums up perfectly what much of Stan's life was about - gently prodding us to recognize the centrality of the environment in our moral universe. He will be missed.

1. GAYTON, D. 1990. The Wheatgrass Mechanism. Fifth House Publishers, Saskatoon.

2. ROWE, S. 1990. Home Place: Essays on Ecology. NeWest Publishers, Edmonton.

3. ROWE, S. 2001. What on earth is life: an ecological view. *Ecosystem Health* 7 (3):141

GUIDELINES FOR AUTHORS

Blue Jay is the quarterly journal of Nature Saskatchewan and publishes articles on natural history of the prairie provinces and adjacent regions. Articles, Notes, Letters and Book Reviews in the field of the region's natural history are encouraged. All submissions are reviewed by the editors and at least one other person competent in the subject area, and manuscripts are accepted for publication only after approval by the reviewers and editors. All members of Nature Saskatchewan are encouraged to write for *Blue Jay*, and submissions from non-members are equally welcome.

Manuscripts prepared on a typewriter, by hand, or by computer are acceptable. However, because all documents must be put into electronic form before being sent to the printer, electronic submission is strongly encouraged. (on a computer diskette, CD or by E-mail).

These guidelines are intended to help writers in the preparation of manuscripts as well as to streamline and ease the task of editing. Manuscripts that do not follow these guidelines will still be considered for publication; necessary modifications can be made by the author, as needed, during the review process.

PLEASE NOTE: Before submitting a manuscript to *Blue Jay*, all authors, new and experienced, are asked to read these guidelines from beginning to end, paying special attention to the sections on tables and figures (2.6 & 2.7), references (2.8), how to submit photographs (4.1) and how to make electronic submissions (1.2 & 5).

There are two basic formats for manuscripts published in *Blue Jay*: one for longer ARTICLES and another for shorter NOTES, LETTERS AND BOOK REVIEWS. Differences in style between these two categories, where they exist, are noted below.

1 - Preparation of Manuscripts

1.1 - Writing Style: The writing style should be suitable for the general public. This does not mean that content must be limited to simple subjects, but rather that the writing should be clear and devoid of jargon and unnecessary technical terms. Scientific articles also should be written in an easily-readable style.

1.2 - Word Processors and Computers: Use 12-point, Times New Roman font, one-inch margins and left justification. Limit formatting commands to **bold** and *italics*. Please Do Not use features such as hanging indents, customized tab settings, columns, or tables. These create extra work during editing and printing.

1.3 - Typewritten and Handwritten submissions: Double space the entire manuscript. Double underline words that are to appear in italics.

1.4 - Scientific Names : Scientific (*Latin*) names are not used in *Blue Jay* for North American birds, mammals and butterflies because standardized English common names are available for these species. The first letter of each word of a species' Common Name is in Upper Case for 1st letter of each word only. For most other groups, both the common and scientific (*Latin*) name should be used the first time the species is mentioned, and in the following format: Common Name (*Genus species*). Thereafter, only the common name is used. General English names for groups of species and names that are not standardized are in lower case (e.g. 12 robins versus 12 American Robins). If no common name is appropriate, the scientific name, in italics, is used throughout the manuscript (e.g.

Tyrannosaurus rex or *Tyrannosaurus*).

Choosing the appropriate common name can be problematic in some instances; the associate editors and editors will try to supply standardized or widely-used common names as needed. The following references are used by *Blue Jay* as sources of standardized common names.

AMERICAN ORNITHOLOGISTS UNION. 1998. Checklist of North American Birds. 7th Edition. American Ornithologists Union, Washington, D. C.

WILSON, D. E., and D. M. REEDER (eds). 1993. Mammal Species of the World. Smithsonian Institution Press, Washington DC. Available via the Internet at <http://nmnhwww.si.edu/msw/>

LAYBERRY, R. A., P. W. HALL and J. D. FONTAINE. 1998. The Butterflies of Canada. University of Toronto Press, Toronto.

1.5 - Names of People: In general, people should be referred to by first and last names (initials may replace the first names) and without titles such as Dr., Mr., Ms., etc. Rarely, it may be appropriate to use official titles (Her Majesty Queen Elizabeth II versus Betty Windsor).

1.6 - Numbers: Numbers from one to nine (inclusive) are written as words; however, numerals (digits) are always used with standard units of measure, including dates, times, page numbers, percentages, etc. (e.g. 2 km, 7 %). Numerals are used for all numbers 10 or larger. When a number less than 10 occurs in a sequence with numbers of 10 or greater, then the smaller number also should be a numeral (e.g. 5 to 25 catbirds). Do not begin a sentence with a numeral; reword the sentence, write out the number in words, or end the preceding sentence with a semi-colon. Use words to shorten very large numbers (e.g. 1.6 million).

1.7 - Time: Time may be expressed using either the 12- or 24-hour clock. When using the 24-hour clock, the time is given as four digits, two each for hours and for minutes, not separated by a colon and followed by 'h' for hours, (e.g. 0830h, 2030h). The 12-hour clock notation requires the use of a colon between the hours and minutes and the designation a.m. or p.m. (e.g. 8:30 a.m.).

1.8 - Distance: Measures of distance may be given in either the English (miles) or metric (kilometres) systems; however, use only one system within a manuscript. Mile is abbreviated 'mi.'. There is no period following the abbreviated symbols in the metric system - kilometre is designated as km, metre - m, centimetre - cm, etc.

1.9 - Direction: Directions are indicated by abbreviations: N, S, E, W, NE, NW, SE, SW, all upper case and without periods.

If there is uncertainty about aspects of format and style, consult a recent issue of *Blue Jay* for similar types of articles, or contact the editors.

2 - Format

2.1 - Titles: Titles of articles are in UPPER CASE and begin at the left hand margin at the top of the first page. For book reviews, the title of the review is the title of the book being reviewed. It is followed by a complete reference citation for the book (see section 2.8 below), including the current retail price in hard and/or soft cover, and the ISBN number.

2.2 - Authors' Names: For ARTICLES, these are written in UPPER CASE and begin at the left hand margin following the title. For NOTES, LETTERS AND BOOK REVIEWS, these are written in *Italic Print*, first letters in upper case, and placed as the last line of the manuscript, following the references (if there are any).

2.3 - Authors' Addresses: The address of each author follows each author's name on the same line as the name (see 2.2 above). The complete postal address of each author is given in standard upper and lower case with no abbreviations except for two-letter abbreviations for provinces and states. The postal code follows the province. Each author's E-mail address (optional) follows the postal code in the format "E-mail:<palliser@triangle.net>".

2.4 - Paragraphs: Double-space between paragraphs, without indentation of the first word.

2.5 - Sub-headings: Sub-headings and other subdivisions of the text should be used only when necessary and should be kept to a minimum. The standard format for a sub-heading is upper and lower case in bold-face type (e.g. **Standard Sub-heading**).

2.6 - Tables: Tables are numbered consecutively in the order in which they are cited in the text, and are cited in the text by number (e.g. Table 2). The table's title should be in upper and lower case (e.g. Table 1: Bird Numbers). Tables should not be submitted as part of the text of the manuscript. Instead, each table should be on a separate page placed after the list of references. Prepare simple tables using tab, space bar and a minimum of horizontal lines, or using a spreadsheet program such as Excel or Quattro Pro. Complicated or graphically-complex tables may be submitted in a graphic file format such as ".jpg" of ".tif", separate from the word processor text file. Because of formatting errors that can arise when tables are transferred electronically to the publisher, we prefer to receive on-paper copies of tables that are exactly as they are to appear in print (camera-ready) and can be scanned and treated as images by the publisher.

2.7 - Figures : Figures include all photographs, graphs, maps and drawings. They are numbered consecutively in the order in which they appear in the text and are cited in the text by number (e.g. Fig.1). Each figure should be submitted on a separate page and each also should be submitted in electronic format as a file in a graphic file format such as ".jpg" or ".tif", separate from the word processor text file. Figure legends and captions should be written on their own page, separate from the figures themselves. Electronic graphics should have a resolution of at least 600 DPI.

2.8 - References: References are listed in alphabetical order according to the first author's surname, and not in the sequence in which they appear in the text. The references are then numbered and are cited in the text as a superscript number placed at the end of the sentence to which they refer and after the period that ends the sentence (e.g. ... were described previously.[2]). When more than one reference is cited, superscript numbers are separated by commas (e.g. ... were described previously. [1, 2, 5-7, 9]). Please note that the reference numbers follow the period that ends the sentence.

The list of references follows the last paragraph of the text, or the acknowledgements section if there is one. No subheading such as "References" or "Literature Cited" is used. The names and initials of all authors are printed in UPPER CASE. Titles of journal articles and book chapters are in lower case, with upper case used only for the first letter of the first word in the title and in all proper nouns. Titles of books, journals and magazines are in Upper and Lower Case. *Titles of journals and magazines* (but not of books) are *italicized.* Titles of journals and magazines should be written out in full, and not abbreviated.

Examples of the format used for the most common types of references are given below.

Books :
1. KAUFMAN, K. 1996. Lives of North American Birds. Houghton Mifflin, Boston.

Journal or Magazine Articles:
1. KYDD, T.E., P. T. BARNUM AND R. VIRCHOW. 1986. Additional observations of the Barred Owl in Alberta. *Blue Jay* 44:41-43.

Book Chapters:
1. HEISER, C. B. 1995. The ethnobotany of domesticated plants. In: Shultes, R. E. and S. von Reis (eds.). Ethnobotany, Evolution of a Discipline. Dioscorides Press, Portland, Oregon. p. 200-203.

Personal Communications:
Personal communications are cited within the text and not in the list of references. The person's name and the date on which the communication was made (when possible) are given in the following format within the text: (I.M. Source, 14 January 2003, pers. comm.). It is the author's responsibility to ensure that the person being cited is aware that he or she is being cited and agrees with the content of the citation.

It is the responsibility of the authors to ensure that the citations in the list of references are accurate and complete in all details. Inaccurate citations are a disservice to readers so PLEASE make sure that each citation is sufficiently complete that readers could find each reference in an appropriate library or book outlet.

3 - Photographs and Artwork

Photographs, drawings and other artwork related to the natural history of the prairie provinces and adjacent regions are always welcome submissions, whether or not they are associated with an article. *Blue Jay* maintains a file of such illustrations and uses them whenever there is an opportunity to do so, which is often. The name of the photographer or artist should be included along with a caption. See guidelines below for submission of photographs and artwork. Photographs and artwork submitted will become part of *Blue Jay*'s permanent collection.

4 - How to make submissions to *Blue Jay*

- Accompany each submission with a short cover letter or E-mail message giving a name, postal address, telephone number and E-mail address of the person to be contacted about the article.

- If manuscripts are hand-written or prepared on a typewriter, two copies of high quality should be submitted. If the manuscript is prepared on a computer or word processor, only the electronic file(s) needs to be submitted on diskette/CD or as an E-mail attachment(s) (see instructions or electronic submissions below). Submissions should be mailed directly to the editors. Authors should themselves retain one complete copy of the manuscript. Photographs and other illustrations do not need to be submitted in duplicate.

4.1 - Photographs: Prints are preferred to slides, but slides also are acceptable. If slides are submitted, send originals, not duplicates. Make and retain duplicate copies of all slides submitted in case the original is lost in the mail. Nature Saskatchewan will make every effort to return slides but cannot guarantee their safe passage through the postal system. Label all photographs on the back with the photographer's name and, if the photograph accompanies an article, the figure number. Electronic Photographs: High-quality electronic images also can be submitted and are welcome. Electronic photographs must have a resolution of at least 600 DPI. If the photograph is part of a manuscript, captions should be included in the manuscript as a separate page in the manuscript itself. Captions for photographs that are not submitted as figures in a manuscript should be written on the back of the photograph or on separate pages included with the photographs (or included in an E-mail message, if submitting photographs electronically by E-mail).

4.2 - Drawings and other Artwork: These should be submitted following all the above guidelines for photographs. Valuable artwork should not be submitted in the original. Instead, a high-quality photocopy, photograph or electronic image should be submitted.

5 - Electronic submissions

Manuscripts submitted in electronic form may be in any one of four different word processor formats: WordPerfect, Microsoft Word, Rich Text Format (rtf), or ASCII Text. They can be submitted to the editors in one of two ways : by E-mail or on diskette/CD.

E-mail. The manuscript should be sent as an attached file in one of the four word processor formats listed above. Do not use HTML format when sending manuscripts by E-mail. The editors' E-mail address is <leighton@sasktel.net>. Illustrations and figures not sent electronically should be mailed to the editors and clearly identified by title and author(s) as belonging to the manuscript. If there is any question about how to send a document by E-mail, please contact the editors for advice.

Diskette/CD: Diskettes or CDs can be sent to the editors by regular mail. If files are submitted on a diskette, use a 3.5" diskette in IBM-compatible format. Apple/MacIntosh computer users should ensure that the diskette or file on CD is in IBM-compatible format and not in Apple/MacIntosh format. Problems with diskette format incompatibility can be overcome by sending the manuscript by E-mail.

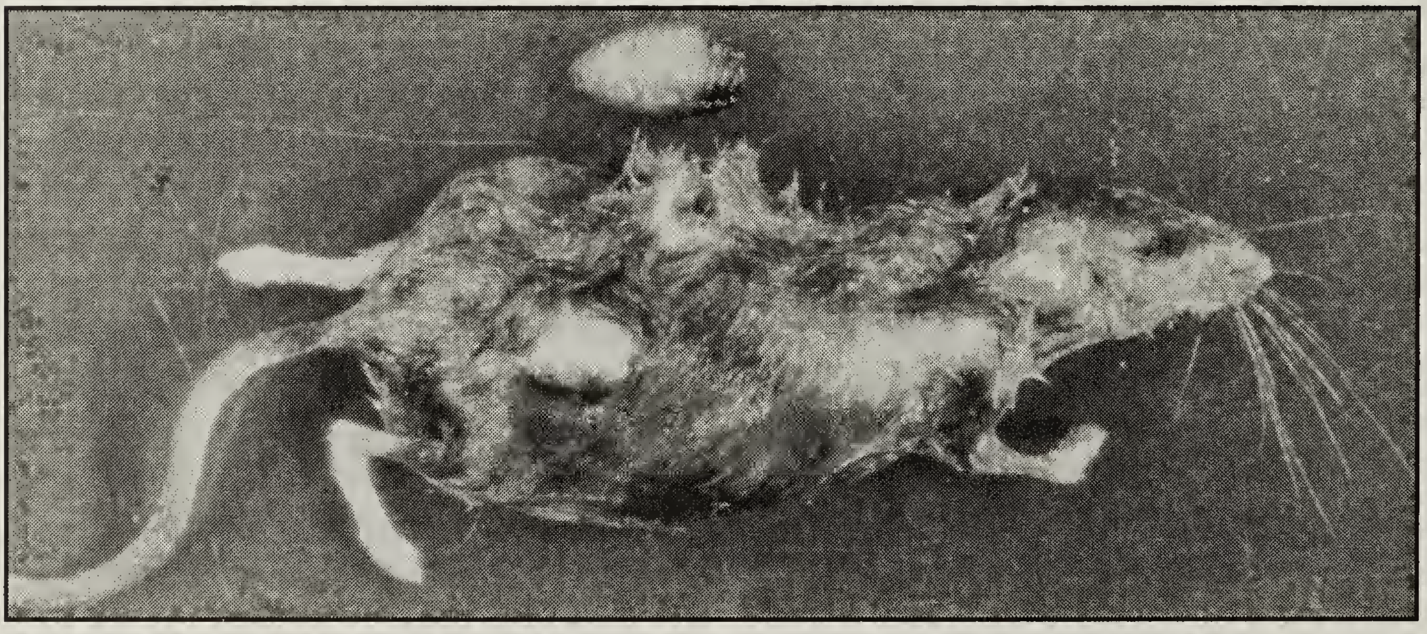
6 - Submission Deadlines

Submission deadlines are: 1 January (for the March issue), 1 April (for June), 1 July (for September) and 1 October (for December).

Further Information : contact the editors (Anna and Ted Leighton) at 328 Saskatchewan Crescent West, Saskatoon, SK S7M 0A4; E-mail: <leighton@sasktel.net>; telephone: (306) 665-6074.

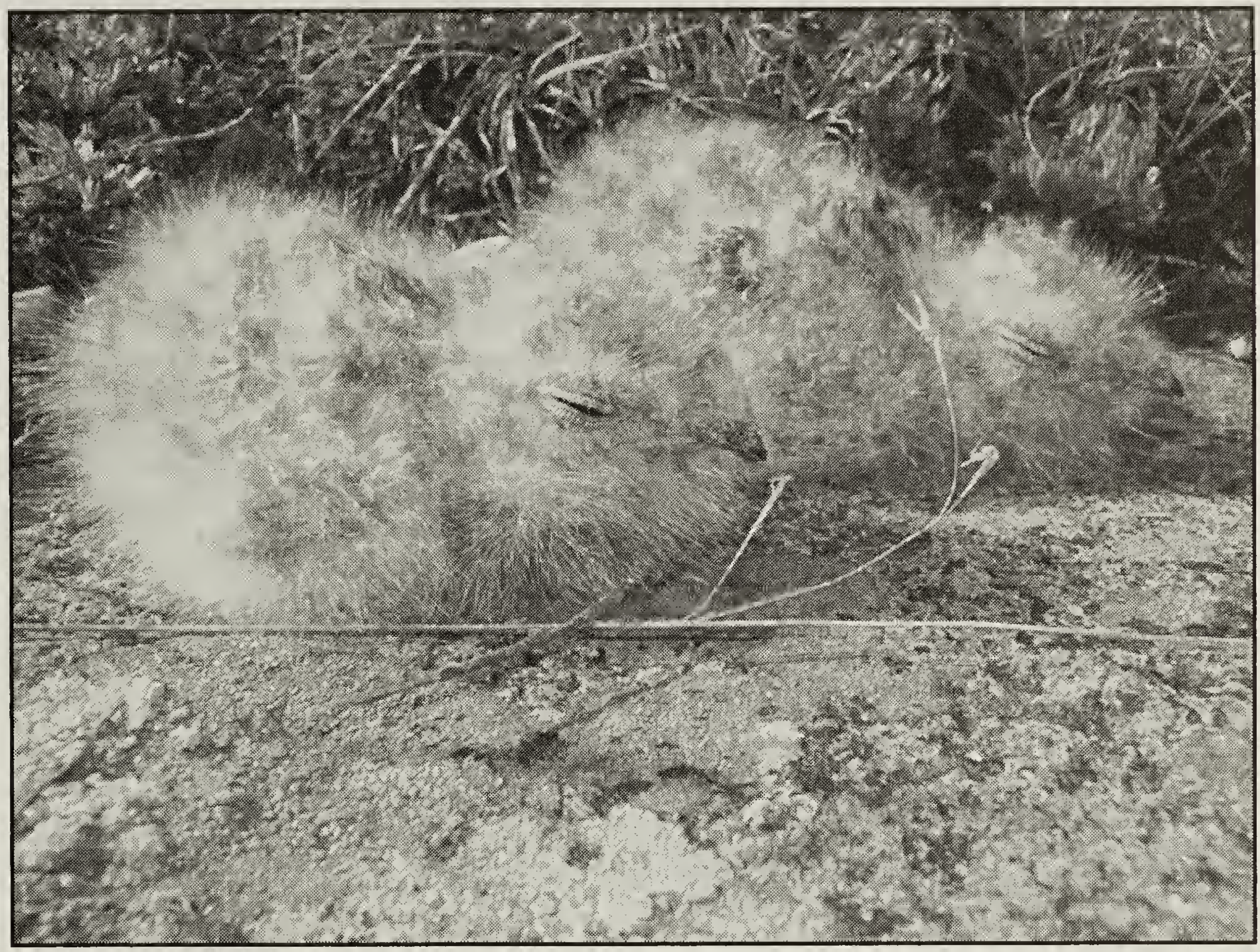
MYSTERY PHOTO

SEPTEMBER 2004 MYSTERY PHOTO



In early August, this Deer Mouse drowned in a water trough 10 km N of Saskatoon. It was host to two guests, one of which has decided that it is pointless to keep "riding a dead horse" and has jumped off. It is shown here beside its former host, while the other guest remains as a lump under the mouse's skin. What are these creatures ?

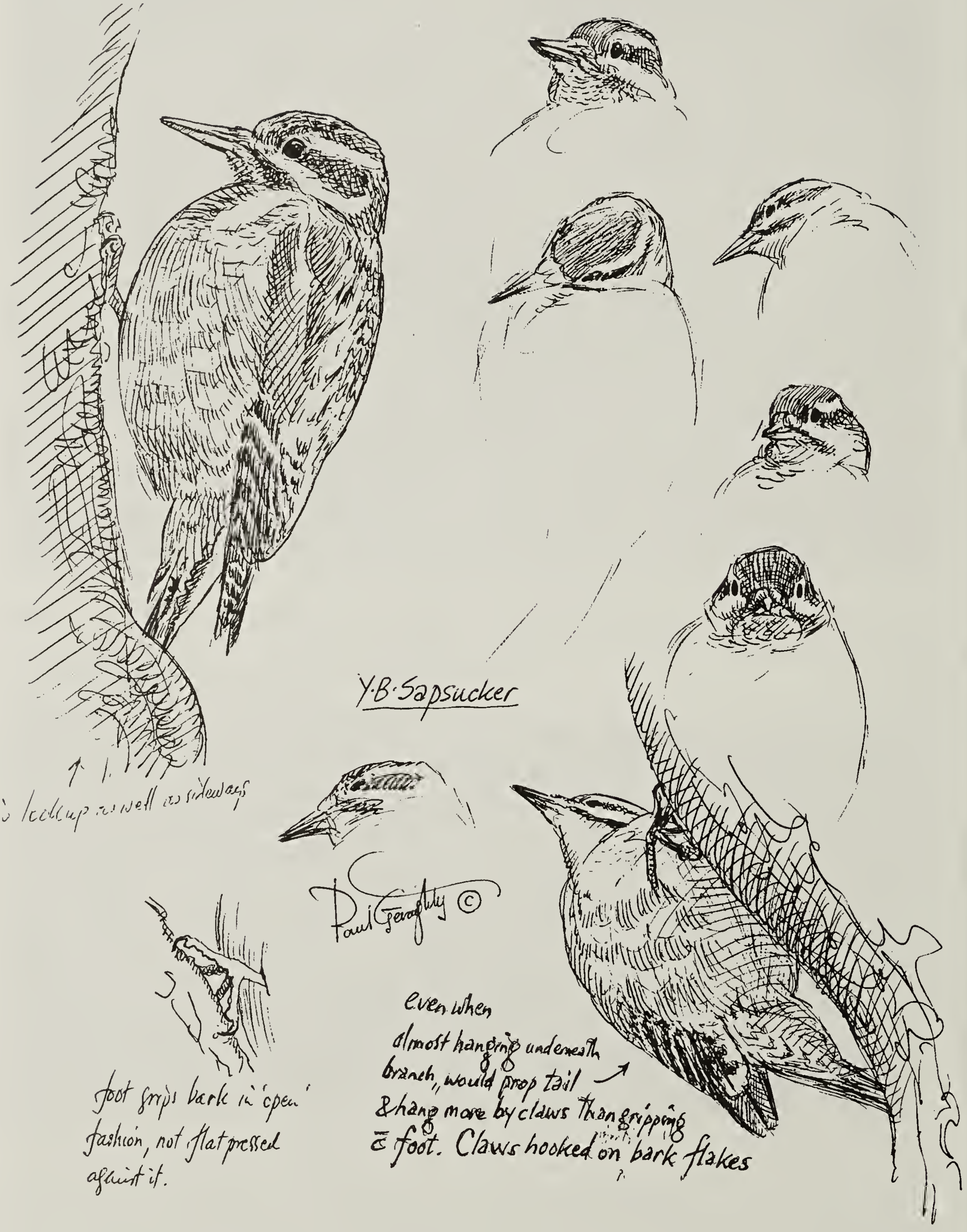
ANSWER TO JUNE MYSTERY PHOTO



Mark Brigham has provided the following comment on the Mystery Photo in the June 2004 Issue.

The photo is of two Common Nighthawk chicks. The subtle clues in the photo as to their identity are the fact that all members of this group, the Caprimulgids, in Saskatchewan lay 2 and only 2 eggs. Secondly, the chicks are on a flat surface, a rock in this case, and not in a kind of nest, again typical this group of birds. Except for extreme SW Ontario, Saskatchewan is the only place in Canada were 3 species of "goatsuckers" or "nightjars" occur (nighthawks, poorwills and whippoorwills). Nightjars are large-eyed birds with tiny bills but a huge gape, and rather short necks and legs. Given the coloration of the chicks and the inability to see the length of the developing tail, it is possible that these are Common Poorwill chicks, but since the photo was taken in SE Saskatchewan where poorwills do not occur, they must be nighthawks. Common Nighthawks nest throughout the province. They are well known for nesting on flat roofed buildings covered in pea-gravel, but they will use any relatively flat surface with minimal vegetation (e.g., bare dirt, rock, burned areas). Nighthawks are inappropriately named given that they are actually more crepuscular (forage at dusk and dawn) than nocturnal (night) and they are certainly not raptors (hawks), but in fact "hawk" flying insects while themselves flying in a manner akin to swifts and swallows. They are amongst the last migrants to arrive in Saskatchewan in the spring (usually not until mid-to-late May) and the first to leave (mid-to-late August). They probably winter in northern Argentina. Recent work suggests that, like poorwills and whippoorwills, they have the ability to enter short bouts of torpor (reduced metabolic rate and body temperature), although they appear to employ this strategy only in emergencies.

② Sep 17 '92



Y·B·Sapsucker

view look up as well as sideways

foot grips bark in 'open' fashion, not flat pressed against it.

even when almost hanging underneath branch, would prop tail & hang more by claws than gripping c̄ foot. Claws hooked on bark flakes

Paul Geraghty ©

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Publication Mail Agreement # 40063014
Return Undeliverable Canadian Addresses To
Administration Centre Printing Services
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BIBLIOGRAPHIC SERVICES - SERI11/6
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